COMMERCIAL FISHERIES
ABSTRACTS

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FISH TECHNOLOGY EXPERIMENT STATION,
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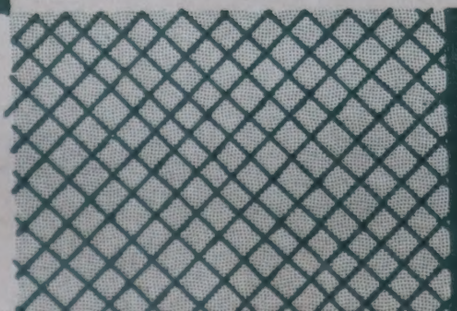
U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES



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UNITED STATES DEPARTMENT OF THE INTERIOR
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BUREAU OF COMMERCIAL FISHERIES

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0.116 (*)

AN AUTOMATED MULTIPLE ENZYME MONITOR FOR COLUMN CHROMATOGRAPHY

Beck, C. (General Mills, Inc., 9000 Plymouth Avenue, North, Minneapolis, Minnesota), and A. L. Tappel
Analytical Biochemistry 21, No. 2, 208-218 (November 1967)

This paper reports use of a single, automated flow system to monitor the activity of five hydrolytic enzymes in the chromatography of the soluble enzyme fraction of liver lysosomes. Fluorometric estimation of protein content, use of a commercial sampler as a fraction collector, and several equipment modifications are also discussed. The described system uses less than one-fourth of each fraction collected.

The chromatography of the soluble enzyme fraction of rat liver lysosomes from a carboxymethylcellulose column is monitored by a single flow path to give protein fluorescence and to show the distribution of five lysosomal enzymes via the chromogenic substrates. The sample is used for both sampling and fraction collection, and is modified for external on-off control, for slaving a second sampler, and for greater cam variability. A series of colorimeters is used to detect the products at two dilutions despite a variation in peak absorbances. Additional possible chromatographic applications of multiple enzyme analyzers using a single flow path are discussed. [20 references]

*Items on back of card.

 ABSTRACTER: M. F. Tripple

0.36 (*)

INFLUENCE OF PROCESSING PROCEDURES ON THE POST-MORTEM PERMEABILITY OF CHICKEN MUSCLE SARCOLEMMAS TO PROTEIN

Osner, R. C. (Low Temperature Research Station, Cambridge, England)
Journal of Food Science 31, No. 6, 832-837 (November-December 1966)

The premeability of sarcolemmas (muscle-fiber membrane) of intact chicken muscle was studied in relation to the following conditions: (a) pH of the Ringer's solution surrounding the muscle; (b) bathing the muscle in distilled water; (c) rigor; (d) freezing and thawing; and (e) commercial processing. It was found that change between 5.5 and 7.5 in the pH of Ringer's solution had no effect on the sarcolemmas. However, bathing in distilled water, freezing and thawing, muscle restraint during rigor, and normal commercial processing all made the sarcolemma permeable to protein. When isolated chicken muscles were immersed in distilled water for 24 hours, 1.7 percent of the total muscle protein was lost. Isolated muscles that were not restrained during rigor were not permeable to protein when immersed in Ringer's solution, but muscles that had passed through rigor while still on the carcass were permeable. It was concluded that intracellular protein can be lost from carcasses both as a result of processing and during thawing, although the amount lost is not large. [17 references]

*Items on back of card.

 ABSTRACTER: M. M. Gwin

0.118 (*)

A CRITIQUE AND MANUAL FOR A NEW TECHNIQUE IN INDUCTIVE SALINOMETRY

Van Landingham, John W. (Bureau of Commercial Fisheries, Tropical Atlantic Biological Laboratory, Miami, Florida)
Journal of Ocean Technology 2, No. 1, 53-58 (December 1967)

The author states that the salinometry instruments now available are capable of producing much better and more reliable measurements than they presently do. He believes that much of the difficulty an operator has in getting high-quality data is directly attributable to faulty operating techniques, which result in unstable cell geometry. To attain the potential that he believes the instruments have, he has proposed an 18-step operating procedure that, he argues, will yield nearly perfect replication of conductance values.

Using this procedure, he analyzed 282 samples and compared the results with the results of an analysis of 92 samples measured by the conventional technique. The standard deviation of the samples analyzed by the new technique was 0.001 percent; that of the samples analyzed by the conventional technique was 0.033 percent. With the new technique, the average deviation of duplicate samples from their mean was 0.0006 percent; with the conventional technique, it was 0.026 percent.

*Items on back of card.

 ABSTRACTER: L. Baldwin

0.5 (*)

LYSIS OF ESCHERICHIA COLI BY MARINE MICRO-ORGANISMS

Mitchell, R., and Shlomit Yankofsky (Laboratory of Applied Microbiology, Division of Engineering and Applied Physics, Harvard University, Cambridge, Massachusetts)
Nature 215, No. 5103, 891-893 (August 19, 1967)

Escherichia coli is the common indicator organism for pollution by intestinal pathogens. Investigations of the lethal effect of sea water on E. coli have suggested a variety of possible mechanisms. The negative effect of heat sterilization of sea water on its specific bactericidal action indicates a biological interaction that has not been studied. The authors attempted to define the role of the native microflora in the disappearance of E. coli from sea water.

The relation between the size of the marine microbial population and the rate of death of E. coli was studied using sea-water concentrates of different population densities. The lethal effect of sea water on E. coli increased with (1) increasing population size, as determined on a peptone-yeast extract agar, and (2) with an increasing number of lytic bacteria on inoculation with E. coli. These findings supported the authors' assumption that indigenous microflora significantly contribute to this effect. A more complex effect is suggested by the results of studies on other qualities of sea water, particularly heavy concentration of metal and presence of algal toxins. It is reasonable to assume that the nature of the lethal effect of sea water on E. coli will vary with seasonal and local changes of the environmental conditions.

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 ABSTRACTER: M. F. Tripple

AUTOMATED MULTIPLE ENZYME MONITOR FOR CHROMATOGRAPHY COLUMNS

A NEW TECHNIQUE IN INDUCTIVE SALINOMETRY

PROCESSING AND SARCOLEMMA PERMEABILITY

LYSIS OF ESCHERICHIA COLI BY MARINE MICROORGANISMS

0.119 IMPROVED MULTIPOINT INOCULATING DEVICE FOR REPLICA PLATING

Seman, John P., Jr. (Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington 98102)
Applied Microbiology 15, No. 6, 1514-1516 (November 1967)

Various multiple-inoculating devices have been developed for the rapid assay of large numbers of microbial cultures. The advantages of the replica-plating system of Lederberg and Lederberg (1952), as applied to mass inoculation procedures, are well known. Several multipoint-inoculating devices have been developed that have additional advantages to velveteen replica plating. The multipoint inoculator described in this paper incorporates many of the basic designs of the previous devices, plus additional features that increase its operational efficiency and expand its range of application. The replicator, with its accessories, offers the following improvements: (1) the device is easy to use because it is light weight and uncomplicated; (2) the entire unit may be autoclaved or oven sterilized, and sterility is maintained by flaming the needles after each set; and (3) the removable inoculating units simplify the replacement and adjustment of needles and offer the possibility of several alterations. The device has been used in yeast and bacterial studies that involved a variety of tests for biochemical and physiological properties. The result has been a saving of time and a simplification of procedures. [Abstracter: M. F. Tripple]

Chemical Abstracts 63, 2101e (July 19, 1965)
Padegimas, B., V. Vaiciuvenas, and A. Krukonis

0.114 PORTABLE APPARATUS FOR MICROELECTROPHORESIS IN AGAR

0.116 A SIMPLE DEVICE FOR PREPARATIVE TLC

Sims, R. P. A., G. M. Ings, M. E. McKillican, J. A. G. Larose (Food Research Institute and the Ottawa Services Section, Research Branch, Canada Department of Agriculture, Ottawa, Canada)
Lipids 1, No. 6, 452-453 (November 1966)

A "sandwich" type plate holder for preparative thin-layer chromatography uses plates of silicic acid that are 0.25 and 0.50 millimeters thick. The plate holder requires only the use of readily available materials and can be made up quite easily in any sheet metal shop. This holder has been used for several types of lipid separations and has shown that generally the plates in the holder developed more rapidly than single plates did. With most of the solvent systems used, the resolution was good as long as the spots were 1 centimeter or more from the sides of the silica gel. Although this holder was developed for preparative thin-layer chromatography in which plates coated with a standard thickness of silicic acid are used, it has proved just as useful for nonpreparative purposes. [Abstracter: M. M. Gwin]

The computer is now being used in the laboratory as an integral part of the experimental apparatus proper. On-line computers are allowing new freedom in the design and conduct of scientific experiments. The expanding field of laboratory automation is the subject of this article. [Abstracter: M. F. Tripple]

Spinrad, R. J. (Computer Systems Group, Brookhaven National Laboratory, Upton, New York)
Science 158, No. 3797, 55-60 (October 6, 1967)

0.11 AUTOMATION IN THE LABORATORY

0.5 SALINITY EFFECT ON THE MAXIMAL GROWTH TEMPERATURE OF SOME BACTERIA ISOLATED FROM MARINE ENVIRONMENTS

Stanley, Simon O., and Richard Y. Morita (Departments of Microbiology and Oceanography, Oregon State University, Corvallis 97331)
Journal of Bacteriology 95, No. 1, 169-173 (January 1968)

Salinity is defined as the total amount of solid material in grams contained in 1 kilogram of sea water when all the carbonate has been converted to oxide, the bromine and iodine replaced by chlorine, and all organic matter completely oxidized. The salinity of most of the ocean is rather constant at about 35 ‰. This paper deals with the effect of salinity on the maximal growth temperatures of certain bacteria that were isolated from various marine environments.

The salinity of the growth medium had a marked effect on the maximal growth temperature of four bacteria isolated from marine sources. Vibrio marinus MP-1 had a maximal growth temperature of 21.2° C. at a salinity of 35 ‰ and a maximal growth temperature of 10.5° C. at a salinity of 7 ‰, which was the lowest salinity at which this bacteria would grow. This effect of salinity on maximal growth temperature was due to the presence of various cations in the medium. When cations were added to dilute sea water, the order of effectiveness of the cations in restoring the normal maximal growth temperature was $Na^+ > Li^+ > Mg^{++} > K^+ > Rb^+ > NH_4$. The anions tested had no marked effect on the maximal growth temperature response, with the exception of $SO_4^=$. The highest maximal growth temperature in a completely defined medium was 20.0° C. at 0.40 M NaCl. A decrease in the maximal growth temperature was seen with both high and low concentrations of NaCl. [14 references] [Abstracter: M. F. Tripple]

0.36 POST-RIGOR CHANGES IN SELECTED PHYSICOCHEMICAL PROPERTIES OF MYOSIN B FRACTION OF TURKEY MUSCLE

Scharpf, L. G., Jr., W. W. Marion, and R. H. Forsythe (Iowa State University of Science and Technology, Ames 50010)
Journal of Food Science 31, No. 5, 680-685 (September-October 1966)

The changes occurring in physicochemical properties of the myosin-B fraction of turkey muscle were analyzed during 44-hour postrigor aging. The sedimentation patterns of myosin-B fractions prepared 48 hours after death indicated a decrease in a high-molecular-weight component believed to be myosin-B gel. The author concluded that myosin-B fractions lose their gel-forming ability with the resolution of rigor. Density-gradient centrifugal patterns showed small increases in the slowly sedimenting components of myosin-B fractions as postrigor aging progressed. These components were high in adenosine triphosphatase (ATPase) activity when calcium ions were present and showed no reduction of viscosity with the addition of ATP. The dissociation of myosin B into myosin A and actin with the resolution of rigor may also represent disruption of the myosin-B gel formed during and after extraction from the muscle. [20 references]
[Abstracter: M. F. Tripple]

Chemical Abstracts 68, No. 7, 28559s (February 12, 1968)
Oshima, Hiroshi (Wakkanai Fishery Inst., Wakkanai, Japan)

0.37 THE CHANGE OF BOUND WATER OF FISH MEAT DURING PROCESSING

MULTIPOINT INOCULATING DEVICE FOR REPLICA PLATING
MICROELECTROPHORESIS IN AGAR
PLATE HOLDERS FOR THIN-LAYER CHROMATOGRAPHY
USE OF COMPUTERS IN LABORATORIES

EFFECT OF SALINITY ON GROWTH OF MARINE BACTERIA
POSTRIGOR CHANGES IN MYOSIN-B FRACTION OF MUSCLE
BOUND WATER CONTENT OF FISH DURING PROCESSING

0.6 MICROENCAPSULATION -- A TECHNIQUE FOR LIMITLESS PRODUCTS

Sirine, Gloria (Stanford Research Institute, Menlo Park, California)
Food Product Development 2, No. 2, 30-31, 34 (April-May 1968)

Basically, microencapsulation is a means of coating particles. The ease of coating very small particles, the unique ways in which the coatings are applied, and the range of materials used for the coatings make the process exceedingly versatile. For example, one might want to add a flavor-carrying oil to a dry mix. Ordinarily the flavor would quickly lose strength, the mix would tend to cake, and the oil might penetrate the package walls unless expensive packaging were used. Encapsulating the oil would by convert it into a pseudosolid. Thereby its caking tendencies would be curbed, its wall-penetrating capability restricted, its stability increased, and its volatility reduced.

Several methods have been used for encapsulation. With one of the most versatile and widely used, the oils are first emulsified in a dilute aqueous solution of some polymer, such as gelatin. Another dissolved substance (usually another polymer or a salt) is added, causing the first polymer to separate as a more concentrated solution and surround the individual oil droplets in the emulsion. This concentrated solution is then solidified into microcapsules. When the residual solvent is removed, the microcapsules are converted to what appears to be a dry free-flowing powder; actually the capsules are from 60 to 98 percent oil.

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 ABSTRACTER: L. Baldwin

1.01512 [FISHERIES] TECHNOLOGY

Anonymous
Indian Fisheries Bulletin 11, No. 1, p. 17 ff. (January 1964)

Studies on the practical aspects of icing, transportation, and freezing of fishery products were continued. Field trials to test the efficiency of improved types of containers for iced fish substantiated results obtained in laboratory experiments. Modified containers of bamboo baskets lined with kraft paper or jute sacking and polyethylene gave good preservation of fish for long periods, thus cutting down on the quantity of ice required for preservation and transportation.

The researchers found that the "belly-bursting" phenomenon in iced sardines occurred only during certain months. The possibility of a correlation between belly bursting and variations in stomach contents or changes in fat content is being studied. It has been established that softening of the belly walls occurs only toward the end of the storage period and that this softening is mainly due to the enzymes produced by the growing bacteria. When bacterial growth is retarded, there is no significant softening; softening increases when the bacterial counts start increasing.

Changes in the quality of frozen prawns during storage under conditions of fluctuating temperature were studied. The data collected indicated that a storage

(over)

 ABSTRACTER: M. F. Tripple

0.8 (*) CHEMICAL WORKS ON THE SEA BED

Morgan, Robert (Marine Resources Research Unit, Portsmouth College of Technology, England)
New Scientist 37, No. 579, 90-91 (January 11, 1968)

Operating a chemical plant on the sea bed is technically feasible at the present. There are several good reasons why an underwater site would have advantages over a site on land, such as the constantly rising price of land. Underwater plants would also save excessive port costs and delays. Any noxious gases that are byproducts of the process could be released or burnt off at the surface of the sea. The containers and interconnections for storage of gases or liquids at high pressure under the sea could be made thinner and cheaper because the increased ambient pressure underwater would reduce the pressure differential between the outside and inside of the tank. Some chemical processes require large amounts of water, and an underwater plant could disperse heat directly into the water.

Underwater plants handling liquid or semiliquid products might be placed in atolls in mid ocean. Fish meal or fish protein concentrate could be produced in the Indian or Pacific Oceans, thus stimulating greater use of local fisheries resources and providing cheap protein for Asia.

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 ABSTRACTER: M. F. Tripple

1.4 (*) NORTHERN RANGE EXTENSIONS FOR THREE SPECIES OF ROCKFISH (SEBASTODES FLAVIDUS, S. PAUCISPINIS, AND S. PINNIGER) IN THE NORTH PACIFIC OCEAN

Westrheim, S. J. (Fisheries Research Board of Canada, Biological Station, Nanaimo, British Columbia)
Journal of the Fisheries Research Board of Canada 23, No. 9, 1469-1471 (September 1966)

During September 1965, three species of rockfish not previously recorded from southeast Alaska waters were collected in that area. Two specimens identified as yellowtail rockfish (Sebastodes flavidus) were collected 16 miles west of Forrester Island (59°49′ N. lat.; 134°00′ W. long.). One specimen identified as bocaccio (S. paucispinis) was collected 11 miles west of Kruzof Island (57°14′ N. lat.; 136°13′ W. long.). A specimen identified as canary rockfish (S. pinniger) was collected 17 miles west of Cape Bartolome (55°16′ N. lat.; 134°07′ W. long.). These finds increase the documented range for all three species. The known ranges of these rockfish species are now documented to extend as follows: yellow rockfish--northward about 250 miles from Hecate Strait, bocaccio--northward about 300 miles from Queen Charlotte Sound, and canary rockfish--northward about 50 miles from Dixon Entrance.

*Items on back of card.

 ABSTRACTER: E. R. Weissman

MICROENCAPSULATION

UNDERWATER CHEMICAL PLANTS

1963 REPORT OF CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY, INDIA

EXTENDED RANGE OF ROCKFISH SPECIES

0.8 REPLACEMENT OF UNDERWATER BEARINGS IN A HIGH RADIATION FIELD

Huff, John B., and Joseph M. Lee (Marine Products Development Irradiator, Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts)
Isotopes and Radiation Technology, Section 2, Food Irradiation 5, No. 1, 25-28 (Fall 1967)

The Marine Products Development Irradiator, which is being used by the U.S. Bureau of Commercial Fisheries to study radiation pasteurization of fish products, contains a 250-kilocurie plaque-form ^{60}Co source. The source is stored vertically underwater; however, since the source is used in the horizontal position, it is moved into the irradiation chamber by an elevator that rides on a 90° curved track. The two roller chains that control the movement of the elevator are guided by 20 sprockets, which originally rolled on ball bearings. The ball bearings failed and were replaced by solid bearings, which are less likely to seize or fail suddenly. The technique used to replace the underwater bearings in the high radiation field generated by the ^{60}Co source and the bearing failures that made the replacement necessary are described in this article. The procedure and tools are described in detail. [Abstracter: M. F. Tripple]

1.4 NORTHERN RANGE EXTENSION RECORDS FOR TWO ROCKFISH SPECIES (SEBASTODES CAURINUS AND S. ELONGATUS)

Westrheim, S. J. (Fisheries Research Board of Canada, Biological Station, Nanaimo, British Columbia)
Journal of the Fisheries Research Board of Canada 23, No. 9, 1455-1456 (September 1966)

On July 9, 1961, a rockfish specimen identified as copper rockfish (Sebastodes caurinus) was collected in Day Harbor, Blying Sound, Alaska (60°00′ N. lat.; 149°06′ W. long.). Four days later, a specimen identified as greenstriped rockfish (S. elongatus) was collected 2 miles southeast of Green Island, Montague Island, Alaska (60°11′ N. lat.; 147°26′ W. long.). Neither the copper nor the greenstriped rockfish had previously been recorded from the area of capture. The known ranges of these rockfish species are now documented to extend as follows: copper rockfish--westward about 500 miles from Cape Spencer, Alaska, and greenstriped rockfish--northward and westward about 1,100 miles from Vancouver Island, British Columbia. [Abstracter: E. R. Weissman]

0.8 CALCULATION OF TEMPERATURE FIELD FOR FROZEN FOOD
Embiik, E.
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 2745, p. 516 (December 1966)

A simplified method for calculating the temperature field for rectangular food packages is described, and an equation for finding the effect of heat transfer coefficients on the temperature distribution is derived.

1.0112 THE ALASKA EARTHQUAKE OF 1964
Hansen, Wallace R. (U.S. Geological Survey, Denver, Colorado)
Nature 215, No. 5099, 348, 349-351 (July 22, 1967)

A review of the immediate damage caused by the Alaska earthquake of March 27, 1964 (for example, wrecking of port facilities and fishing fleets and destruction of marine organisms and their customary habitats) is interspersed with hints of possible long-term benefits (for example, the opening up of new spawning areas and the removal of previously impassable barriers to fish migrations). [18 references]
[Abstracter: L. Baldwin]

0.6 (Cross Reference: 2.3)

Oils are only one of the things that can be encapsulated in this way. Flavors, stabilizers, or antioxidants can be encapsulated in such a way that they are released slowly over a long period of time, quickly upon being heated or chewed, or not until they reach the digestive tract and are attacked by enzymes or bacteria. The rate of release can be controlled over this wide range by varying the size of the capsule, or the thickness or the material of the capsule wall. Fertilizers, pesticides, and all kinds of long-acting medical aids for both man and animal can be encapsulated. The author suggests that using encapsulated nitrates and phosphates that will float or adhere to the sargasso weeds and be released at the proper rate to provide a suitable environment to initiate the food chain could one day turn the whole Sargasso Sea into a profitable fish farm.

Encapsulation can mask the bitter or disagreeable taste of food supplements (for example, some amino acids) without affecting the texture of the food product. Since encapsulation can convert rough particles to smooth spheres, adding encapsulated fish protein concentrate to bread dough could make for a more nutritious bread that still retained its lightness.

In summary, microencapsulation can be used to temporarily convert a liquid to a solid or a powder; protect light- or heat-sensitive materials; protect reactive, easily-oxidized or hydrolyzed, or otherwise unstable products; mix otherwise incompatible mixtures; modify a lyophilic or lyophobic material; provide sustained or controlled release; mask an objectionable taste, texture, or color; or reduce volatility.

1.01512

temperature above 0° F., even for short periods, is likely to affect the quality of the frozen prawns.

Efforts were made to improve the quality of froglegs during processing. Froglegs, especially of the larger size groups, often develop black discoloration at the joints. The present studies are designed to find the causes of such discoloration and to find possible preventive measures. Treatment of discolored legs with compounds of citric and tartaric acids under specific conditions has given good results.

Work was continued on the better utilization of sardine oil. Air-blown sardine oil containing small quantities of certain metallic oxides becomes water insoluble and acquires quick-drying properties. This type of sardine oil might be useful in treating woods for boat building, and this possibility is being investigated.

Standardization of the procedure for preparing acid ensilage from fish has been completed and pilot-plant preparation of the product is being planned. Preliminary work on preparation of enriched cattle feed from acid ensilage has begun, and the nutritive value of products using rice bran as the solid base is being analyzed.

Processing factories continue to receive technical help from the quality control section of the Institute; commercial samples of processed fishery products and samples of water and ice were examined. Efforts to work out a proper cleaning schedule for factories and corrective measures for the maintenance of quality have resulted in a significant decrease in substandard products.

1.82 (*) CLAM SURVEY OFF VIRGINIA (CAPE CHARLES TO FALSE CAPE)

Parker, Phillip S., and Lars A. Fahlen (Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base, Gloucester, Massachusetts)
Commercial Fisheries Review 30, No. 1, 25-34 (January 1968) (Separate No. 804)

During the past few years, production of the surf clam (Spisula solidissima) has exceeded that of both the hard clam (Mercenaria mercenaria) and soft shell clam (Mya arenaria). Total production of the surf clam in 1965 was a record 44 million pounds of shucked meats. Over 60 vessels are now engaged in the surf clam fishery, which is centered off the coast of New Jersey; 96 percent of the total landings are made in New Jersey.

The surveys made in three areas by the Bureau of Commercial Fisheries were designed to locate and define beds of surf clams within each area, to determine the size and extent of these beds, to evaluate their potential for future commercial harvesting, to determine factors affecting the clam populations, and to collect data on other species of shellfish. This paper reports on the third in the continuing series of surf clam surveys; the survey was completed off the coast of Virginia between May 1965 and May 1966. Samples were taken at selected survey sites with a 48-inch hydraulic dredge. During the survey, 1,421 tows were made of which 1,367 tows were of 2- to 4-minute duration and 54 were simulated commercial tows of 20-minute duration.

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 ABSTRACTER: M. F. Tripple

1.953 (*) LATEST NEWS ABOUT THE WHALE SITUATION

Anonymous
New Scientist 35, No. 552, 6 (July 6, 1967)

Norway, Russia, and Japan are the only nations now engaged in Antarctic pelagic whaling. At the midsummer meeting of the International Whaling Commission in London, the three agreed that the nominal catch for the coming season would be limited to 3,200 blue whale units. A blue whale unit is the unit whereby one blue whale (a species that has been nearly extinguished) is figured to equal two fin whales (a species that is being hard pressed for survival) or six sei whales. From calculations of how long whales live and at what rate they breed, the minimum sustainable yield has been reckoned at about 3,300 units.

How the catch limit is to be divided among the three interested nations will have far-reaching effects. Norway, which has only two whaling fleets left, may lose 50 percent of her fleet. Japan, which has a number of competitive and still unpaid-for fleets in her ports, needs all the oil and whale meat possibly available. Only Russia, with her state-controlled industry, can afford to mothball her fleets and wait for the whales to recover. The solution to the dilemma may be to put the system under mandatory control, possibly of the United Nations, or to impose rigid catch limits for each species and area.

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 ABSTRACTER: L. Baldwin

1.85 (*) EXPERIMENTAL TRAWLING AND POT FISHING FOR GIANT ALASKAN PRAWN

Kessler, Doyne W. (Exploratory Fishing and Gear Research Base, Bureau of Commercial Fisheries, Juneau, Alaska 99801)
Commercial Fisheries Review 30, No. 1, 41-44 (January 1968)

The availability of giant Alaskan prawn or spot shrimp (Pandalus platyceros) in southeast Alaskan waters has long been known to local fishermen. Unlike pink shrimp (Pandalus borealis) and side-stripe shrimp (Pandalopsis dispar), which occur in large concentrations on flat, trawlable bottoms, spot shrimp seem to occur on rough, rocky bottoms where conventional trawls cannot be used. As a result, commercial fishing gear has been restricted to shrimp pots, and the spot shrimp fishery has remained a small operation.

Interest in commercial fishing for spot shrimp has expanded during the last few years. The large size, superior quality, and year-round availability of spot shrimp make it ideal for an off-season, small-boat fishery. The Bureau of Commercial Fisheries (BCF) is currently conducting exploratory fishing and gear research studies to delineate the distribution and abundance of spot shrimp and to determine the most efficient type of gear for harvesting this resource. A research cruise was sponsored jointly by the industry and BCF. The cruise was a commercial operation run by commercial fishermen and represented the first commercial shrimping for research purposes in Alaska.

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 ABSTRACTER: M. F. Tripple

2.01 SIGNIFICANCE OF COLIFORMS AND ENTEROCOCCI IN FISH PRODUCTS

Varga, S., and G. W. Anderson (Department of Fisheries, Halifax, Nova Scotia)
Applied Microbiology 16, No. 2, 193-196 (February 1968)

Fecal coliforms and enterococci are often used to assess the hygienic quality of foods. Although these bacteria serve successfully as an index of fecal pollution of water supplies, their usefulness in measuring fecal pollution in foods has been criticized. Fish from unpolluted sea water do not carry fecal coliforms or enteric pathogens; Escherichia coli (a fecal coliform) is not a normal inhabitant of the intestinal tract of marine fish, though it is present in fish from polluted waters. Fish products have often been found to contain large numbers of fecal coliforms, particularly enterococci. Therefore, the indicator bacteria in fish products must originate from the processing environment. The inconsistency between high fecal contamination and good records of public health caused the authors to reevaluate indicator bacteria as an index of the fecal pollution of fish products. The significance of indicator bacteria in lobster meat and fish fillets is discussed in this paper.

The correlation between fecal coliforms and enterococci from lobster meat was negligible at a 95-percent level of significance; the enterococci outnumbered fecal coliforms by 334 to 1. Similar results were obtained with the fillet samples; the enterococci outnumbered fecal coliforms by 122 to 1. Both lobster meat

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 ABSTRACTER: M. F. Tripple

CLAM SURVEY OFF COAST OF VIRGINIA

EXPERIMENTAL FISHING FOR ALASKAN SPOT SHRIMP

WHALING AGREEMENT

COLIFORMS AND ENTEROCOCCI IN FISH PRODUCTS

1.85 (Cross Reference: 2.12)

The first part of the cruise was an attempt by commercial fishermen to capture spot shrimp using various trawls and the telemetry system developed by the BCF's Seattle base. New BCF-developed midwater trawls and combination systems of standard trawls having hydrofoil doors were fished in areas of suspected spot shrimp concentrations. By positioning the trawl off the bottom, it was possible to fish areas too rocky for conventional trawling. Surprisingly, some areas of rough bottom could be trawled on the bottom with this system. The latter part of the cruise was devoted to pot fishing to compare the effectiveness of a commercial shrimp-pot operation with the trawling effort.

The conclusions reached were: (1) bottom trawling took more spot shrimp at night than during the day; and (2) in some areas, spot shrimp can be taken by small shrimp trawls rigged with hydrofoil doors--however, trawls do not seem to be as effective as shrimp pots. In 30 bottom drags, 689 pounds of spot shrimp were taken. Five days of shrimp-pot fishing, during which 47-50 pots were set per day, produced 929 pounds of marketable shrimp.

Until recently spider crabs were considered a nuisance; now, however, they can be made into a valuable processed product. Some of the problems that must still be solved to make them of optimum value are methods of keeping them alive aboard the fishing vessel during hot weather and of landing, processing, and marketing them.

Lever, W. J.
Fisheries of Canada 20, No. 8, 9-11 (February 1968)
Food Science Abstracts 2, No. 4, Abstract No. 68/434, p. 150 (April 1968)

1.86 SPIDER CRAB HAS A NEW IMAGE

1.82 (Cross Reference: 2.12)

Catches ranged from 0 to 9 bushels of surf clams per tow. Of the 1,367 tows made, 717 tows took no surf clams, 596 caught from 1 surf clam to slightly more than a bushel, and 54 tows took 1 bushel or more per 4 minutes of towing time. The 54 simulated commercial tows made in the area produced very poor results; no tow caught 5 bushels of clams in 20 minutes. Abundance, distribution, and size of clams varied considerably. Relations were noted between these variations and environmental data collected. Small populations of ocean quahogs (Arctica islandica) were noted, but these were widely scattered. A relation was observed between bottom sediments and surf clam densities. A close relation was also observed between the size of the catch and water depth; optimum catches occurred between 14 and 20 fathoms. Because of the dredge design, only a few clams of less than 2 inches were collected. As in the previous surveys, the dominant clam length was between 5.5 and 6.7 inches.

The purpose of an experimental venture in lobster production being undertaken off the northwest coast of Scotland is to increase lobster stocks by improving the natural habitat. The availability of underwater cover at times when the lobsters are extremely vulnerable to predators, for instance when they shed their shells, limits the population of adult lobsters. A team of divers intends to tackle the problem by providing artificial cover in selected areas, thereby creating lobster farms that can be harvested on a systematic basis. [Abstracter: M. F. Tripple]

Anonymous
Fishing News p. 5 (May 24, 1968) (London, England)

1.87 FARMING VENTURE WILL PROVIDE SHELTER FOR SCOTTISH LOBSTER POTS

SPIDER CRAB FOR FOOD

EXPERIMENTAL LOBSTER PRODUCTION

2.01

and fish fillets were good media for growth of indicator bacteria. Thus, if the temperature of the processing area is high enough, indicator bacteria can rapidly proliferate on the working surfaces and in the meat itself.

The fish plants from which the samples were obtained normally use 50 p.p.m. of chlorine for disinfection. A chlorine solution of this strength is not adequate to kill the nonsporeforming bacteria adsorbed onto metal surfaces in the plants.

The ratio and correlation between fecal coliforms and enterococci were significantly different in the lobster and fish samples than in human feces. The authors concluded that these organisms must originate from sources other than human pollution. The most likely sources of these bacteria are improperly sanitized working surfaces in the processing plants. The ratio and correlation of fecal coliforms and enterococci from working surfaces, not from feces, account for their rate of multiplication and their resistance in the processing environment. The fact that indicator bacteria can multiply on working surfaces should disqualify these bacteria as an index of fecal pollution in lobster and fillets, although they can be used as an index of plant sanitation. The high resistance of enterococci to disinfection accounts for their predominance over fecal coliforms. [13 references]

1.953 (Cross Reference: 4.19

LIPIDS OF THE FIN WHALE (BALAENOPTERA PHYSALUS) FROM NORTH ATLANTIC WATERS. IV - FIN WHALE MILK

Ackman, R. G., C. A. Eaton, and S. N. Hooper (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)
Canadian Journal of Biochemistry 46, No. 3, 197-203 (March 1968)

The milk of a fin whale (Balaenoptera physalus) was examined so that the authors could determine the origin and characteristics of milk from marine mammals. The total lipid fatty acids of the milk had a composition similar to that of the whale's depot fat; however, it contained more hexadecanoic acid and polyunsaturated fatty acids and less monoethylenic acids. Correspondingly, the iodine value of the milk fat (136) was higher than that of the blubber (105-124). Over 80 percent of the fatty acids in the 2 position of the triglycerides were accounted for by relatively short-chain fatty acids, especially the hexadecanoic, the tetradecanoic, and the hexadecenoic acids, which constituted 54.6, 13.7, and 11.2 percent, respectively, of the total. Thus the iodine value of the monoglyceride fatty acids was only 48. The milk phospholipids had a fatty acid composition basically similar to that of the liver phospholipids, the methyl ester iodine value of which was 120. However, the milk phospholipids contained somewhat more polyunsaturated fatty acids; they had an iodine value of 144.
[47 references] [Abstracter: L. Baldwin]

LIPIDS IN FIN WHALE MILK

2.02 POST-MORTEM DEGRADATION OF ADENINE NUCLEOTIDES IN MUSCLE OF THE LOBSTER, HOMARUS AMERICANUS

Dingle, J. R., J. A. Hines, and Doris I. Fraser (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of Food Science 33, No. 1, 100-103 (January-February 1968)

Adenosine 5'-monophosphate (AMP) aminohydrolase has been found to occur in aqueous extracts of muscle from carp, mackerel, lingcod, and prerigor cod. However, it has been reported that several marine invertebrates lack this enzyme. The authors found that postmortem degradation of adenosine 5'-triphosphate (ATP) in lobster muscle proceeds by way of AMP and inosine 5'-monophosphate (IMP), but that the extractability and apparent activity of the AMP-aminohydrolase involved in the degradation in lobster differ from those found in cod.

Thin-layer chromatography showed that postmortem degradation of adenine nucleotides in the tail muscle of lobster (Homarus americanus) traversed the following route: ATP → adenosine 5'-diphosphate (ADP) → AMP → IMP → inosine → hypoxanthine. When ATP, ADP, AMP, and adenosine were incubated with aqueous and 0.6M KCl extracts of prerigor lobster muscle, the extracts degraded ATP via the same route. Such extracts contained a weak AMP-aminohydrolase activity that was activated by ATP; however, no adenosine aminohydrolase was detected. Neither of the aminohydrolases were found in extracts prepared with water or 0.02M K-succinate.

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 ABSTRACTER: M. F. Tripple

2.113 EPOXY LINER GIVES NEW LIFE TO CORRODED TANKS
(*)

Adamson, Francis B., and John J. Beer (Plant Maintenance, Royal Crown Cola Company, Granite City, Illinois)
Food Processing 29, No. 5, 100 (May 1968)

Problem.--Two 400-gal., mild steel, plastic-lined tanks used to hold solutions containing high concentrations of chlorine, lime, and ferrous sulfate were found to be severely corroded. In some places, the rust had eaten completely through the metal. To avoid discarding the tanks, which were worth about $200 each, the owners needed a repair method that would enable the tanks to withstand a long period of further duty.

Solution.--The tanks were taken out of service and sandblasted. A 15-mil epoxy coating was applied to the inside of the tanks with a roller; a 10-ounce-weight fiberglass cloth was pressed into the coating while it was still wet; and a 15-mil coating was applied over the fiberglass. After the epoxy had cured overnight, a final 10-mil coating was applied to both the interior and the exterior of the tanks. The entire process required about 16 man hours for the two tanks.

Results.--The two renovated tanks have been used for almost 3 years. Neither shows any signs of deterioration.

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 ABSTRACTER: L. Baldwin

2.114 POLAR WATER CONDITIONER
(*)

Anonymous
Norwegian Fishing and Maritime News 13, No. 3, 23 (1966)

A self-contained, completely automatic unit is described for removal of minerals from water and prevention of scale formation in marine plants. The unit is comprised of a system of powerful, permanent magnets enclosed in a steel sleeve. As water passes through the annular space between the magnets and the sleeve, the strong magnetic field turns the minerals into a mobile sludge. The unit can be made self cleansing, or can be periodically flushed.

The unit is said to eliminate the need for chemically softening the water used in marine equipment such as boilers, diesel-engine cooling systems, heat exchangers, fresh-water systems, and sea-water evaporators. The manufacturer claims that periodic descaling of this equipment will no longer be necessary when the magnetic unit is installed and that scale already in the equipment will gradually dissolve and be removed. The continuous cleansing action of the unit allows more efficient transfer of heat within any system to which it is incorporated, and reduces wear on feed pumps by keeping the circulation pressure constant. The units are claimed to pay for themselves in 18 months by eliminating the cost of chemically treating the water.

The unit may be installed in the feedline of any new or existing plant, and it may be installed on either side of a feed or circulating pump. Standard sizes

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 ABSTRACTER: E. R. Weissman

2.115 VERSATILE "CAT" DESIGN IN STEEL

Anonymous
World Fishing 17, No. 3, 36-38 (March 1968)

The most advanced catamaran design produced to date can be adapted to all fishing methods, although it is primarily envisaged as a stern trawler with gear for twin-rig trawling. The vessel is designed for all-welded construction in steel and differs from other catamarans of similar and smaller sizes in having hulls with a draft of almost 6 feet and a unique bow design developed to overcome the confused water produced between the hulls.

The bows are snubbed to save weight and tonnage. The inside faces of the hulls are parallel to the centerline to reduce the confused water. The twin beams do not need the usually associated safety gear because of the inherent stability of the catamaran. The masts and gantry, along with the other superstructure, are designed to be constructed in high strength tubular steel and plate. The working deck has a clear working space of 45 feet by 15 feet. The hydraulic winches, situated on the quarters, are arranged so that the warp runs are clear of the working space. Guarded dollies on the aft side of the bridge structure are fitted for the operation of the twin booms for beam trawling; however, an otter trawl can be operated over the ramp at the same time. Specially designed rudders are to be fitted to give the vessel the maneuverability usually associated with fishing vessels; the rudders and propellers will operate in tunnels beneath the hulls.

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 ABSTRACTER: M. F. Tripple

DEGRADATION OF NUCLEOTIDES IN LOBSTER MUSCLE

REFURBISHING CORRODED TANKS

MAGNETIC WATER SOFTENER

STEEL CATAMARAN FISHING VESSEL

2.114 MECHANICAL ENGINEERING IN THE DEEP-SEA FISHING INDUSTRY

Eddie, G. C.
World Fisheries Abstracts 17, No. 1, 11-12 (January-March 1966)

The need for fishing fleets to go farther afield, the fishermen's desire for a better balance of costs and earnings, and the consumers' insistence on a quality product have given rise to a number of innovations in the mechanical equipment used by the fishing industry. The author reviews these developments and their potential effect on the economics of the industry.

Research on trawl gear, freezing plants, and certain new methods that are forcing the industry to approach the design of ships more rationally are described. The lack of knowledge in several critical areas (for example, the movement of vessels in a seaway and the flow of boiling refrigerants and transfer of heat to them) is noted. Engineering effort in fisheries development in the United Kingdom is mentioned briefly.

The author emphasizes that much of the applied research and development being done requires the co-operation of engineers and biological scientists--the exchange of knowledge and ideas should by no means be all in one direction.
[Extractor: L. Baldwin]

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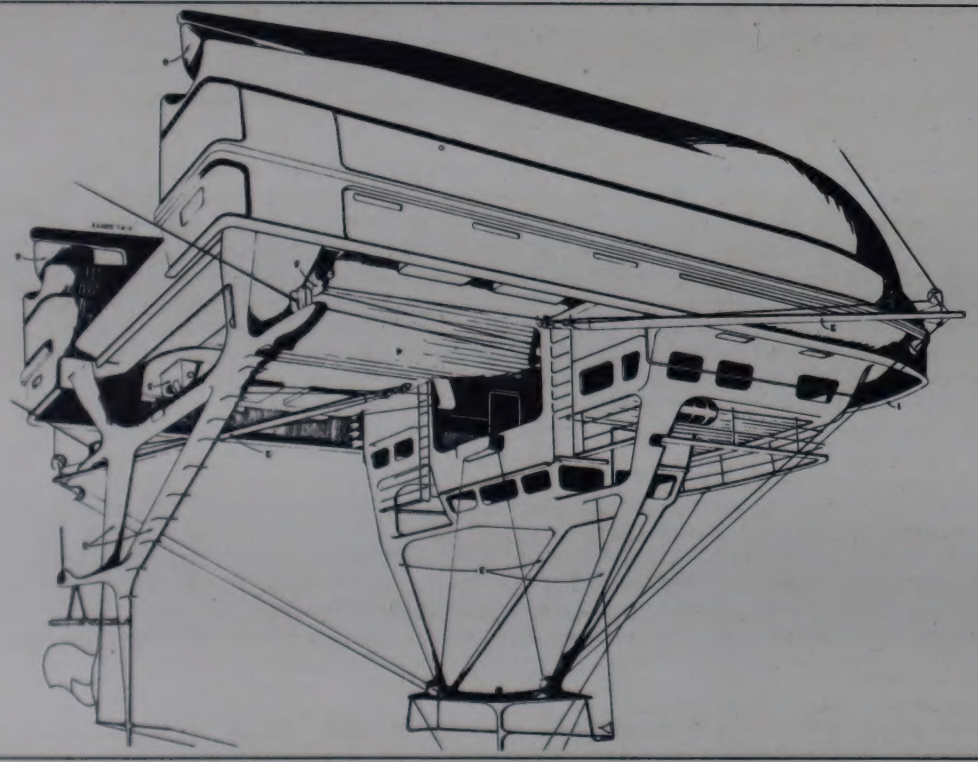
of the unit range in capacity from 100 to 24,000 gallons per hour and come with threaded or flanged connections for pipe of 3/8 to 6 inches in diameter. The units are pressure tested at 600 psi.



The postmortem degradation of nucleotides in lobster tail muscle appeared to follow the same pathway as in muscles of fishes and higher vertebrates. Possible alternate routes appeared to be eliminated by the failure of the extracts to dephosphorylate inosine diphosphate. No significant amount of an adenosine amino-hydrolase activity was found in the extracts. Thus, the lobster differs from some other invertebrates that use adenosine aminohydrolase rather than AMP-aminohydrolase.

The muscle of lobster differs in several respects from that of cod. Virtually no AMP-aminohydrolase activity was extracted with water or 0.02M succinate from prerigor lobster muscle, whereas these extracts removed a large portion of this enzyme from prerigor cod muscle. The activity of the lobster enzyme appeared to be much lower than that of cod. For example, when a 0.02M succinate extract of cod muscle was diluted fiftyfold, it had an activity of 0.2 μM/ml/min at 2° C. A 0.6M KCl extract of lobster muscle, which contained most of the available enzyme, had an activity of 0.0022 μM/ml/min at 3° C. when diluted tenfold, and only 0.027 μM/ml/min when activated by ATP.

The data suggest that the formation of IMP in the two different muscles occurs at rates of the same order of magnitude. It is possible that the apparent discrepancy in enzyme activity may be caused by inactivation of the lobster enzyme by adsorption on some surface.

2.3 GOVERNMENT KNOWS INDUSTRY PROBLEMS BUT STILL MUST ACT TO STOP POLLUTION

MacVicar, N.
Food in Canada 28, No. 2, 35, 51, 53 (1968)
Food Science Abstracts 2, No. 4, Abstract No. 68/504, p. 177 (April 1968)

Some of the problems that must be overcome by those in the food-processing industry to improve water pollution control are mentioned. Since many of the disposal problems are complex, it should be possible to correct them in stages. All methods proposed for water treatment must be approved by the authorities before being put into action.

2.3 APPARATUS AND METHOD FOR REMOVING MEAT FROM CRABS

Canadian Patent 775,293
Food Science Abstracts 2, No. 4, Abstract No. 68/438, p. 151 (April 1968)

The machine described (with diagrams) cuts the claws and removes the meat from the body sections of crabs by suction.

Conclusion.--The cost of the treatment represented about a quarter of the replacement cost of the tanks. No special skill is required of the person applying the treatment, and, since the formulation is odorless and not flammable, no special precautions have to be taken during the coating process.

2.119 PARACHUTE-TYPE SEA ANCHOR

Hipkins, Fred W. (Exploratory Fishing and Gear Research Base, Seattle, Washington)
Commercial Fisheries Review 30, No. 5, 34-35 (May 1968) (Separate No. 815)

The Bureau of Commercial Fisheries has tested a buoyed canopy type of sea anchor that is designed to improve the safety of vessels during stormy weather. Basically, the anchor is of a parachute configuration with reinforced shroud lines that will not tear from the canopy in heavy seas. Weights are used in some models to prevent rotation. A control line is connected to a buoy, which in turn is connected to the crown of the canopy and allows the canopy to collapse when hauled in. The anchor opens automatically after the buoyline and towline have been payed out because the drifting vessel pulls on the towline and opens the chute. Ten minutes after the anchor is launched, the vessel will turn with the bow facing into the wind and waves and remain in that position. The anchor can be launched and retrieved by two persons. It may be repacked wet.

The anchor comes in two types and several sizes. The F-type anchor was designed to check the drifting speed of a vessel. With wind velocity steady at 26 knots, the F-type anchor reduced the drifting speed of the test vessel from 2.6 knots to 0.3 knot.

The PS-type anchor was designed to keep the bow of the vessel into the wind and waves, when drifting at night, or when a breakdown occurs. The PS-type was

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 ABSTRACTER: M. F. Tripple

2.41 (*) CLEANING OF PLASTIC AUCTION FISH BOXES AT BREMERHAVEN (GERMANY)

Anonymous
Allgemeine Fischwirtschaftszeintung 19, No. 7, 4-5 (1967)
World Fisheries Abstracts 18, No. 3, 27-28 (July-September 1967)

A washing machine for cleaning plastic fish boxes and unloading baskets has been designed and constructed and is now in operation at Bremerhaven. The machine is 8 m. long, 2.5 m. wide, and 3 m. high. It can wash up to 1,100 boxes an hour if the boxes are no larger than 150 x 50 x 30 cm.

A U-shaped conveyor above the machine operates at a speed that can be varied from 2 to 15 m. per minute. The conveyor has fittings for hanging the boxes to be cleaned. Appropriate belts load and unload the boxes automatically. The whole transport system can be manned by one operator and three workmen.

The washing machine itself has four operating sections:

1. Preliminary rinsing. Here, coarse dirt is removed by a spray squirting cold water on the whole surface of the case at a pressure of 6 atm. (86.9 p.s.i.).

2. Washing. Here, the boxes are soaked in water heated to 40°-45° C. and containing about 0.5 percent of alkaline detergent and cleaned at a pressure of 3 atm. (43.4 p.s.i.).

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 EXTRACTOR: L. Baldwin

2.3 RENOVATED BEEF PLANT STANDS READY TO INNOVATE

Anonymous
National Provisioner 158, No. 18, 8-11 (May 14, 1968)

Early in 1967, the general manager of a Minnesota packing plant called in the local federal inspector and together they decided what had to be done to bring the 70-year-old plant up to federal standards. Part of the idea was to increase the plant's production capacity and expand its boning operations. Following the conference with the inspector, a design-engineering firm was contacted to prepare the necessary blueprints. The age of the building posed problems against final approval, but with the help of government officials, full clearance was obtained and work was begun.

The biggest part of the renovation was installation of a floor that is safe, sanitary, and esthetically pleasing. For the purpose, a new seamless flooring was poured in three layers over the existing concrete and maple floor. The total thickness is only 1/16 inch, which meets the specifications of the Minneapolis fire marshall, who had initially rejected the plans to pour concrete over a wood base in the Class 1 fire zone in which the plant was located. The flooring was installed in the packaging room, the boning room area, the storage cooler, the unloading dock area, and the front entryway. Since these last two areas are heavily traveled, they have a much coarser surface to provide increased safety.

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 ABSTRACTER: L. Baldwin

3.15 (*) NEW SMELLS FROM SPOILED FISH

Pelroy, Gretchen A. (Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington)
Canner/Packer 136, No. 12, 22-23 (November 1967)

The Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington, has found that packaging plays an important role in controlling the rate at which the bacteria that survived irradiation multiplied and finally produced spoilage. Although the storage life of the fish was increased by radiation treatment, when the fish finally spoiled they did not smell as spoiled fish normally smell. The spoiled, irradiated fish had sour and vinegary odors rather than the typical putrid and ammoniacal odors. Laboratory studies showed that the bacteria that finally spoiled the irradiated fish were quite different from the bacteria that cause spoilage of untreated fish. As more experiments were conducted with various plastic films and packaging materials, different spoilage odors were noticed, and new types of bacteria were found to be associated with these new odors. Because the radiation dose and storage temperature remained constant throughout the experiments, the researchers concluded that the packaging method controlled the type of bacterial spoilage that occurred in irradiated fish.

In addition to the primary function of the packaging material--keeping the product clean and free from contamination--the packaging material controls the chemical composition of the air surrounding the product. Most bacteria need oxygen

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 ABSTRACTER: M. F. Tripple

PARACHUTE-TYPE SEA ANCHOR

UPGRADING SANITARY ENVIRONMENT OF PACKING PLANT

CLEANING PLASTIC FISH BOXES

PACKAGING OF IRRADIATED FISH

2.3

Federal inspectors waived requirements that the floors be sloped toward drains, since the company had bought an automatic scrubber to clean the floors with. This machine emits the water and cleaning solutions, scrubs the floor, and vacuums the water up in one operation.

The flooring material, which weighs less than 1 pound per square foot, is best installed at temperatures of above 55° F., so the cooler had to be shut down while the flooring was installed and until it had cured. The minimum time before the floor is ready for full use again is 8 hours. The installed flooring can withstand temperatures down to -60° F., it will bear the weight of trucks, and it is esthetically attractive.

In addition to the floor, the firm refurbished the walls in the main cooling room. A flexible, weather-resistant, high-pressure laminate surfaced with a fused procelain enamel was used. The glasslike surface provides a durable, easily cleaned, sanitary wall area. Other advantages of these two improvements are the reduced maintenance and increased efficiency of the plant.

These two major changes, plus such others as new, automated loading and unloading facilities, added refrigeration, a new boiler, and new locker-room facilities for employees have helped the firm meet the requirements of the recently passed Wholesome Meat Act.

3.15 (Cross References: 3.238, 3.2385)

for survival (obligate aerobes); however, there is a group of bacteria that are inhibited or killed by exposure to oxygen (obligate anaerobes), and there is a middle group that is basically not affected by oxygen (facultative anaerobes). By controlling the oxygen level of the container, the packaging material determines which of the surviving bacterial groups will grow. Some packaging materials, such as polyethylene, are effective in preventing the passage of water, bacteria, and dirt, but permit ready movement of gases into and out of the container. When irradiated fish is packaged in an oxygen-permeable film, the aerobic bacteria grow and break down the flesh to produce the compounds that contribute to the putrid odors of spoiled fish. Other packaging materials are impermeable to gas and can exclude oxygen from the atmosphere. When irradiated fish is vacuum packaged in these materials, only anaerobic and facultative bacteria can grow; the facultative bacteria (lactobacilli) produce sour or vinegary odors. Although these odors are different from those ordinarily found in spoiled fish, they are sufficiently unpleasant and strong to tell the consumer that the product is inedible.

Vacuum packaging enhances the bacteria-killing effect of radiation by preventing the regrowth of the aerobic bacteria. Rancidity can be minimized by excluding air from the package during irradiation. Air can be excluded by vacuum packing, tightly packing the fish into the cans, or packing in polyester pouches.

3.15 EFFECT OF IRRADIATION TEMPERATURE ON ORGANOLEPTIC, PHYSICAL, AND CHEMICAL PROPERTIES OF BEEF

Harlan, Jerry W., F. Leo Kauffman, and Fred Heiligman (Swift and Co., Chicago, Ill.)
Chemical Abstracts 66, No. 9, 36640k (February 27, 1967)

2.119

tested in winds of 38 knots, gusting to 63 knots. When the wind gusted above 38 knots, the bow of the vessel would swing away from the direction of the wind and 2-3 minutes were required to reestablish the bow into the wind. The swinging motion was almost completely eliminated by paying out additional lines totaling 400 feet. Had the towline been bridled through both the port and starboard chocks to cause a straight pull on the bow, this motion would not have occurred. During all tests, the rolling of the ship was greatly reduced, and the crew was pleased with the performance of the anchor.

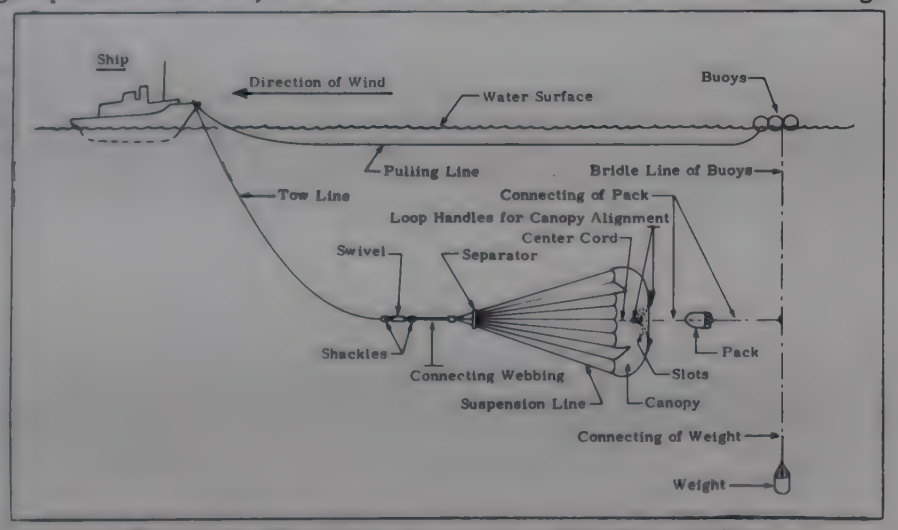

Figure 1 - General arrangement of F-type anchor.

2.41 (Cross Reference: 2.3)

3. Final rinsing. Here, the softened residue of dirt and fish is removed by jets of cold water sprayed over the boxes at a pressure of 16 atm. (231.9 p.s.i.).

4. Disinfecting. Here, the entire box is sprayed with a disinfectant. These four sections are separated by neutral areas so that liquids used in the various treatments will not be mixed. Automatic filters remove the dirt.

The equipment includes pumps and tanks that can be used with hot water, steam, oil, or gas. This cleaning system is operated electrically and has a 100-kw. connection for heating the water. A switchboard controls all functions of the system through a main switch.

2.3 PACKER'S ODOR CONTROL ALMOST 100% EFFECTIVE

Case, P.
Food in Canada 28, No. 2, 37-40 (1968)
Food Science Abstracts 2, No. 4, Abstract No. 68/502, p. 177 (April 1968)

Methods used by one food processor for controlling air pollution, and for controlling odors in particular, are considered. Some specific examples of the operations that cause odors and the processes used for overcoming them are discussed. Two-stage recirculating air washing and two-stage exhaust air washing systems are described; detailed diagrams of the equipment used are included.

EFFECTS OF IRRADIATION TEMPERATURE

METHODS FOR CONTROLLING AIR POLLUTION

3.15 EFFECT OF γ IRRADIATION ON THE MICROFLORA OF FRESHWATER FISH. III - SPOILAGE PATTERNS AND EXTENSION OF REFRIGERATED STORAGE LIFE OF YELLOW PERCH FILLETS IRRADIATED TO 0.1 AND 0.2 MEGARADS

Kazanas, N., and J. A. Emerson (Bureau of Commercial Fisheries Technological Laboratory, Ann Arbor, Michigan 48107)
Applied Microbiology 16, No. 2, 242-247 (February 1968)

Previous studies have shown that treatment of fresh-water fishery products with substerilization doses of ionizing radiation alters the microbial spoilage patterns usually found in untreated fish. Particular groups of microorganisms that commonly contribute to characteristic types of spoilage may be eliminated by the selective action of irradiation and may be replaced by other groups during storage of the fish. Treatment of samples with 0.3 and 0.6 Mrad resulted in a residual flora which, if composed mainly of Achromobacter-Alcaligenese-Mima, produced a sweetish odor. If the residual flora were principally composed of yeasts, the flora produced sour-yeasty odors. In either case, the putrid odor characteristic of untreated fish was not noticed.

In attempts to extend the shelf life of refrigerated fillets, with minimal disturbance of the essential composition of the total flora, the authors examined the effects of 0.1 and 0.2 Mrad of ionizing radiation on commercially processed fillets of yellow perch (Perca flavescens) stored at 1° C. Shelf life was estimated with organoleptic procedures. Microbiological studies included an

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 ABSTRACTER: M. F. Tripple

3.8 (*) THE MICROFLORA OF SEMI-PRESERVED FISH PRODUCTS. III - PRINCIPAL GROUPS OF BACTERIA OCCURRING IN TITBITS

Erichsen, Inger (Swedish Institute for Food Preservation Research, Göteborg, Sweden)
Journal of Microbiology and Serology 33, No. 1, pp. 107-112 (1967)

In previous studies by the author and associates (1962, 1964, 1966), attempts were made to increase the keeping quality of "titbits," the Scandinavian semi-preserved fish product, by various means. In these prior investigations, the microflora in the raw material and in the canned product was studied before and after fermentation. The organisms most commonly encountered during maturation of the fish in barrels of brine were micrococci, gram-positive rods, and yeasts. The same types of organisms were also frequently found in freshly canned titbits. During storage of the cans, however, the microflora changed by selective proliferation of microaerophilic types, which are halotolerant and may produce gas.

The large number of bacterial cultures isolated during the course of the previous work have been identified and classified.

The microorganisms that were found to dominate successively in fermented cans of titbits and in cans stored for some time at room temperature were categorized in the following groups.

Group 1: gram-positive, catalase-positive cocci that occur singly or in clusters. Strains from this group were classified in the family Micrococcaceae;

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 ABSTRACTER: M. F. Tripple

3.335 (*) MASSMEEN

Anonymous
Central Institute of Fisheries Technology (September 1964) (Ernakulam, India)
Indian Fisheries Bulletin 11, No. 4, 14 (October 1964)

The preparation and composition of massmeen, a specialty product manufactured from tuna on Minicoy Island, were investigated. The fish paste that is a by-product of the industry was also examined. The object was to explore the possibilities of standardizing and improving the method of manufacture.

In the samples studied, both the moisture content of the final product and the uptake of moisture in the reconstituted product varied widely. All the samples stored at 72, 75, and 80 percent relative humidity deteriorated within 2 months; those stored at 70 percent relative humidity did not. Mite infestation was the common cause.

Exploratory work was also started on converting some of the cheaper varieties of fish (for example, shark, ray, and skate) into a product like massmeen. The product attained was similar to the massmeen made from tuna, although the flavor was slightly different. In the massmeen made from shark, the original urea content of the shark was reduced from 6.0 to 1.5 percent D.W.B., a reduction that removed the characteristic urea flavor of the shark.

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 ABSTRACTER: L. Baldwin

4.3 (*) STUDIES ON CAUSE OF COLOR REVISION OF EDIBLE SOYBEAN OIL AND ITS PREVENTION. PART I - RELATION BETWEEN THE MOISTURE OF SOYBEANS AND THE QUANTITY OF TOCOPHEROL IN THEM

Komoda, Mamoru, Noriji Ōnuki, and Ichiro Harada (Hohnen Oil Co., Ltd., Shimizu-shi, Japan)
Agricultural and Biological Chemistry 30, No. 9, 906-912 (September 1966)

Oils obtained from soybeans having various moisture contents were examined for their properties and minor constituents. Both the amount of crude oil yielded by extraction and the tocopherol content of the extracted oils were found to be correlated with the moisture content of the soybeans, which ranged from 8 to 18 percent. When moistened raw soybeans having a moisture content of 18 percent were dried until the moisture content was 8 percent, the tocopherol content of the extracted crude oil increased. This increase occurred only when whole beans, not crushed raw beans were dried. When soybeans with a moisture content of 13 percent and a tocopherol content of 1.25 mg/g were dried to reduce the moisture to 1.9 percent, the tocopherol content in the crude oil increased to 1.90 mg/g. When the dried soybeans were moistened to give a moisture content of 18 percent, the tocopherol content decreased to 0.33 mg/g.

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 ABSTRACTER: M. F. Tripple

EFFECT OF MICROFLORA ON IRRADIATION OF FISH

PRODUCTION OF MASSMEEN

MICROFLORA OF SEMIPRESERVED FISH PRODUCTS

RELATION OF MOISTURE AND TOCOPHEROL IN SOYBEAN OIL

3.331 (Cross Reference: 1.01512)

CANNING OF MACKEREL IN OIL

Anonymous
Fish Technology Newsletter 5, No. 2 (July 1964)
Indian Fisheries Bulletin 11, No. 3, 13-15 (July 1964)

The mackerel fishery is one of India's most important marine fisheries. The average annual catch from 1960 to 1962 was almost 66,000 metric tons, largely of Rastrelliger kanagurta but also including R. neglectus and R. brachysoma. The fishery itself extends along the western coast from roughly the central area to the southern tip of the country.

Presently, a small part of the total landings is consumed fresh; more than half is dry salted, wet salted, or pickled; only a limited amount is canned. Most of the canned mackerel is supplied to the defense forces, though the demand for the product, internally and externally, is increasing. Because few of the factories seem to be following any standard procedure for canning, the Central Institute of Fisheries Technology has recommended one that they suggest will improve the quality of the finished product. The procedure is given. It covers selecting the material, cleaning, brining, and cooking; packing, filling with oil, exhausting, seaming, and cooling the can. [Abstracter: L. Baldwin]

3.335 SOME SPECIES OF FISH AND PRESERVATIVES IN THE MANUFACTURE OF FISH SAUSAGE

Krishnaswamy, M. A., T. M. Rudraseetty, and G. D. Revankar
Chemical Abstracts 64, 2661h (January 17, 1966)

3.15

investigation of the effects of irradiation on the total aerobic population lag phase and growth rate of the aerobic microorganisms. Organisms taken from fillets during the course of spoilage were generically identified, and their proteolytic activity was assessed.

Plate counts of the fillets prior to irradiation showed the presence of about 10^6 organisms per gram of sample. Irradiation of 0.1 and 0.2 Mrad produced 1.4 and 3 logarithm reductions in the initial count, respectively. Irradiation about doubled the shelf life of the fillets. Organisms initially isolated from the non-irradiated fillets, in order of decreasing number, were Flavobacterium, Micrococcus-Sarcina, Achromobacter-Alcaligenes-Mima, Pseudomonas, Microbacterium, Vibrio, Bacillus, Corynebacterium, Lactobacillus, Brevibacterium, and Aeromonas. After 6 and 9 days of storage, Pseudomonas and the Achromobacter group were the predominant organisms on the fillets. All members of the genus Flavobacterium were proteolytically active on raw fish-juice agar and skim-milk agar media; not all members of the genus Pseudomonas were active on the same media. The Achromobacter group was nonproteolytic on both media. Residual flora of the irradiated fillets consisted of the Achromobacter group, Lactobacillus, Micrococcus-Sarcina, and Bacillus. The sequence of these microorganisms in predominance varied with dose level. Not all the proteolytic bacteria in the fillets were eliminated by the irradiation; proteolytic Micrococcus-Sarcina survived the irradiation.

CANNING INDIAN MACKEREL IN OIL
MANUFACTURE OF FISH SAUSAGE

4.4

HYDROLYSIS OF FLAVIN-ADENINE DINUCLEOTIDE BY RAT LIVER LYSOSOMES

Ragab, M. H. (University of Alexandria, Alexandria, Egypt, U.A.R.); R. Brightwell and A. L. Tappel (Department of Food Science and Technology, University of California, Davis 95616)
Archives of Biochemistry and Biophysics 123, No. 1, 179-185 (January 1968)

The enzymic hydrolysis of flavin-adenine dinucleotide (FAD) by enzymes from plant sources has been studied in detail; however, only passing mention has been made of the hydrolysis of FAD by animal tissues. This paper describes the hydrolysis of FAD by lysosomes and the properties of the lysosomal enzyme, a pyrophosphate, that hydrolyzes FAD to flavin mononucleotide (FMN).

An enzyme that hydrolyzes pure FAD and mitochondrial FAD was found to be present in rat liver lysosomes. This enzyme exhibited latency and had optimum activity at pH 4.0. The enzyme was purified 800-fold from the homogenate and was separated from acid phosphatase by gel filtration on a modified polysaccharide medium. A number of nucleotides and pyrophosphate derivatives inhibited the enzyme; neither ethylenediaminetetraacetate nor Mg^{++} inhibited the activity of the enzyme. The results of chromatographic analysis showed that the enzyme is a pyrophosphatase that hydrolyzes FAD to FMN and adenine monophosphate (AMP). Hydrolysis of FAD was not inhibited by L(+)-tartrate, but hydrolysis of FMN and AMP by acid phosphatase in the same reaction mixtures was prevented by L(+)-tartrate. [24 references] [Abstracter: M. F. Tripple]

3.8

50 strains were further classified into Micrococcus sp. and Staphylococcus sp. The organisms from Group 1 were found in raw material in barrels, in freshly packed samples, and in fermented samples of titbits. They are salt-resistant and grow well under anaerophilic conditions. Some of these strains develop pleasant odors, which may add flavor to the titbits.

Group 2: gram-positive, catalase-negative small cocci that occur in tetrads, singly, or in pairs. Microorganisms in this group were placed in the family Lactobacteriaceae, genus Pediococcus. The genus was further classified into two species--P. cerevisiae and P. halophilus. P. halophilus grows best at comparatively high pH values, is acid-sensitive, and requires at least 5 percent NaCl for growth. P. cerevisiae prefers a more acid medium, with limiting growth values at pH 3.8 to 4.0; it grows at a concentration of 10 percent NaCl.

Group 3: gram-positive, catalase-negative rods that occur mostly in long or short chains; and gram-positive, catalase-negative, elongated cocci that occur in pairs or in short chains. This group predominated in titbits at the time when visual gas formation was observed. The microorganisms in the group belong to the family Lactobacteriaceae; the rods are representatives of the genus Lactobacillus, and the cocci are representatives of genus Leuconostoc. The organisms in Group 3 are heterofermentative, prefer low pH values for carbohydrate fermentation, and are salt resistant. Because of these properties, titbits are a good medium for their growth and gas formation. [10 references]

3.8 APPARATUS FOR PICKLING FOODS

Netherlands Patent Appl. 6,605,703
Chemical Abstracts 66, No. 13, 54389q (March 27, 1967)

HYDROLYSIS OF FAT BY RAT LIVER LYSOSOMES

FOOD-PICKLING APPARATUS (NETH. APPL. 6,605,703)

6.32 (*) NATURE OF THE ALDOLASE ACTIVITY IN A UNICELLULAR RED ALGA

Antia, N. J., and V. Chorney (Fisheries Research Board of Canada, Vancouver Laboratory, Vancouver, British Columbia)
Nature 214, No. 5092, 1028-1029 (June 3, 1967)

In 1962, Jacobi reported that four species of multicellular red algae showed no evidence of fructose-1,6-diphosphate aldolase activity. In the same year, Fewson et al. demonstrated aldolase activity in Chondrus crispus (a multicellular red alga) and in Porphyridium cruentum (a unicellular red alga). The authors of the present article examined P. cruentum and confirmed Fewson's findings. Here they report on certain characteristics of this activity.

Natural aldolases can be assigned to either of two principle types--Type 1 occurs in the more highly evolved forms of life (green algae, protozoa, plants, and animals), whereas Type 2 is found only in primitive organisms (bacteria, yeasts, fungi, and blue-green algae, for example). Since sulfhydryl groups are involved in the action of both types, other criteria had to be used to demonstrate differential sensitivity. Ethylenediaminetetraacetate inhibited the aldolase activities of P. cruentum to a degree sufficient to show the authors that this red alga contains about 75 percent Type 1 and 25 percent Type 2 aldolase. This finding points to an evolutionary advancement from blue-green to red algae at the enzymological level. [13 references]

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 ABSTRACTER: L. Baldwin

6.34 (*) ALGINATES -- VERSATILE MODIFYING AGENTS

Krigsman, J. G. (Albright and Wilson, Ltd., Australia)
Food Technology in Australia (Reproduced by permission)
Food Manufacture Ingredient Survey, pp. 15-17 (March 1968)

Natural water-soluble resins play an extremely important role in the food industry by enabling food processors to produce a variety of foods. These resins are also used in a wide range of other industries, such as textiles, paper, pharmaceuticals and cosmetics, drilling, ore flotation, and water treatment.

The sales volumes of these natural resins are relatively small in comparison with a 3-billion-pound sales volume for natural starches. However, new uses are being discovered each year, and the prospects for future development are promising.

In the category of food-modifying agents, alginates occupy third position in relation to volume and first position in relation to value. This high level of demand for alginates has been achieved in the last 25 years and can be attributed in part to a case of the right product being

Viscosity of 1% solution in water of alginate (Degree of polymerization 680)

Seaweed	Sodium alginate	90% sodium) 10% calcium) alginate
Laminaria cloustoni	300	450
Ascophyllum nodosum	300	1,700

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 ABSTRACTER: M. F. Tripple

6.54 (*) FORTIFICATION OF CEREALS AND CEREAL PRODUCTS WITH PROTEINS AND AMINO ACIDS

Parman, George K. (Agency for International Development, Washington, D.C. 20523)
Journal of Agricultural and Food Chemistry 16, No. 2, 168-171 (March-April 1968)

Vitamin fortification of cereals has significantly improved nutrition in the United States, and its wider use in the developing countries could greatly alleviate vitamin deficiency diseases still prevalent in many areas. Protein fortification of cereals is a logical and necessary extension of the food fortification principle. The purpose of this paper is to call attention to the need for protein fortification of cereals, to discuss the rationale, to summarize the fortification ingredients currently or potentially available, and to mention the critical factors in the fortification approach.

Fortification of staple cereals with protein concentrates or pure amino acids improves the nutritive value of the cereals. Concentrates from peanuts, cottonseed, and coconut may be used. The use of soya concentrates may encourage a valuable new crop. Protein isolates from all these sources provide flexibility in fortification and afford a base for a variety of acceptable and nutritious foods. Fish protein concentrates have high nutritive value, are potentially the cheapest animal protein supplement, and utilize existing fishery resources. Milk powder is a valuable protein for fortification, particularly if indigenous production of milk is increased. Single-cell protein, grown on petroleum or other low-cost

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 ABSTRACTER: M. F. Tripple

7.51 (*) ELECTROPHORETIC PATTERNS OF BLOOD SERUM PROTEINS FROM RAINBOW TROUT (SALMO GAIRDNERII)

Thurston, Robert V. (Department of Zoology and Entomology, Montana State University, Bozeman)
Journal of the Fisheries Research Board of Canada 24, No. 10, 2169-2188 (October 1967)

Electrophoretic patterns on acrylamide gels of blood serum proteins from over 400 hatchery rainbow trout (Salmo gairdneri) were examined. The trout were subjected to the following environmental stresses: reduction of oxygen, addition of copper sulfate, addition of sodium sulfite, and different methods of capture. Patterns were compared on the basis of sex, degree of maturity, and location of blood extraction. Comparisons were also made with blood protein patterns of wild rainbow trout.

The electrophoretic patterns showed marked intraspecific differences and revealed a characteristic band for sexually ripe females. Significant variations were attributed to degree of maturity, method of sampling, repeated sampling of the same individual, and method of capture. No significance was attributed to variations caused by reduction of environmental oxygen or addition of sublethal levels of sodium sulfite. Significant pattern variations were caused by addition of copper sulfate. Comparisons of patterns from hatchery trout with those from wild rainbow trout showed significant pattern differences. [28 references]

*Items on back of card.

 ABSTRACTER: A. Reed

6.34 (Cross Reference: 0.6)

available at the right time to meet a specific need. The demand for alginates in the food industry is the result of a number of interdependent factors. Among the factors discussed in this paper are the alginates' acceptability as food constituents; basic physical and and chemical properties; wide-range availability, both as straight alginates and as custom-made proprietary products manufactured to rigid specifications; and economy in use.

Economy in use of alginates

Application	alginate concn.
Gel formation	0.2-5%
Thickening	0.5-2%
Stabilization of ice cream and related products	0.1-0.3%
Stabilization of cream	0.05-0.15%
Stabilization of foam in carbonated drinks	50-100 p.p.m.
Clarification of liquids	5-20 p.p.m.
Flocculation aid in water treatment	0.1-1 p.p.m.

6.34 SEASONAL VARIATION OF VISCOSITY OF SODIUM ALGINATE FROM SARGASSUM SPECIES AND THE PREPARATION OF HIGH-VISCOSITY ALGINATES

Shah, H. N., I. C. Mody, and A. V. Rao (Central Salt and Marine Chem. Res. Inst., Bhavnagar, India)
Chemical Abstracts 68, No. 1, 883u (January 1, 1968)

6.32 ANALYTICAL STUDIES OF IODINE IN FOOD SUBSTANCES
PART I - CHEMICAL FORM OF IODINE IN EDIBLE MARINE ALGAE

Meguro, Hiroshi, Takeki Abe, Takeo Ogasawara, and Katura Tuzimura (Department of Food Chemistry, Faculty of Agriculture, Tohoku University, Kita-6 bancho, Sendai, Japan)
Agricultural and Biological Chemistry 31, No. 9, 999-1002 (September 1967)

Four species of edible brown marine algae (Laminaria japonica, Ecklonia sp., Hijikia fusiforme, and Undaria pinnatifida) were fractionated by trichloroacetic acid precipitation and subsequent chromatography; the iodine content of each fraction was determined. The quantitative determination of the iodide form of iodine was done by eliminating interfering substances in the cell extract by using a weakly basic anion-exchange resin column.

The resin content of each alga was quite diversified because of the differences in species. The content of the iodide form of iodine ranged between 83 and 85 percent of the total iodine content of the sample. Most of the noniodide form of iodine was found in the trichloroacetic acid precipitate, probably in protein-bound form. Each alga contained only traces of the trichloroacetic acid soluble noniodide form of iodine. [Abstracter: M. F. Tripple]

6.34 ADDITION OF A WATER-SOLUBLE ALGINATE TO CANNED FOODS

French Patent 1,472,424
Chemical Abstracts 67, No. 23, 107504c (December 4, 1967)

6.54 EDIBLE PROTEIN (PROTEINE COMESTIBLE)

Vahl, L.
Ind. Aliment. Agric. 84, No. 2, 120-126 (1967) (In French)
Food Science Abstracts 1, No. 8, Abstract No. 67/1102 (August 1967)

Two processes are described for producing fish protein concentrate. In one, the oils are separated from the ground fish before the solution is precipitated in caustic soda. After the protein is filtered, washed with alcohol, and dried, it is white, odorless, and tasteless. In the other process, oil and water are extracted from the ground fish with a solvent mixture, and the flour is purified. Both processes are shown diagrammatically.

6.54 HIGH QUALITY FISH PROTEIN

French Patent 1,492,228
Chemical Abstracts 68, No. 25, 113490g (June 17, 1968)

6.54

substrates, has potential for animal and human feeding. The economic syntheses of pure amino acids make fortification with limiting amino acids practical. Choice of protein, method of fortification, and economic factors are important considerations in fortification. [11 references]

7.51 A MODIFIED METHOD OF ESTIMATION OF FISH MUSCLE PROTEIN BY THE BIURET METHOD

Umemoto, Shigeru (Tokai Regional Fisheries Res. Lab., Tokyo, Japan)
Chemical Abstracts 68, No. 8, 66273b (April 8, 1968)

7.51 A METHOD FOR THE QUANTITATIVE MODIFICATION AND ESTIMATION OF CARBOXYLIC ACID GROUPS IN PROTEINS

Hoare, D. G. (Department of Chemistry, University of York, Heslington, York, England), and D. E. Koshland, Jr. (Department of Biochemistry, University of California, Berkeley 94720)
Journal of Biological Chemistry 242, No. 10, 2447-2453 (May 25, 1967)

A method was developed for the rapid modification, under mild conditions, of carboxyl groups in proteins. The method involved the activation of the carboxyl group by a water-soluble carbodiimide and the subsequent reaction of the activated carboxyl group with a nucleophile such as glycine methyl ester. The kinetics of the reaction indicated that the variation of carbodiimide and nucleophile was limited when quantitative modification was desired; however, a wide variety of reagents can be used if quantitative reaction is not essential. Variation in the structure of the carbodiimide can affect the carboxyl groups that are activated, and variation in the charge, size, and chemical and spectral properties of the nucleophile can alter the type of modification at a specific carboxyl group. The reaction proceeded equally well in high concentrations of urea or guanidine hydrochloride. The method appeared to have wide applicability for analytical purposes and structure-function correlations. [20 references]
[Abstracter: M. F. Tripple]

SEASONAL VARIATION IN SODIUM ALGINATE FROM SARGASSUM

ANALYSIS OF IODINE IN EDIBLE MARINE ALGAE
ADDITION OF ALGINATE TO CANNED SHELLFISH (FR. PAT. 1,472,424)

ESTIMATION OF CARBOXYL ACID GROUPS IN PROTEINS
ESTIMATING FISH MUSCLE PROTEIN

PROCESSES FOR PRODUCING FISH PROTEIN CONCENTRATE
PRODUCTION OF FISH PROTEIN CONCENTRATE (FR. PAT. 1,492,228)

7.52 (*) IMPROVED CHICK BIOASSAYS FOR AVAILABLE LYSINE AND AVAILABLE METHIONINE

Combs, G. F., E. H. Bossard, and G. R. Childs (Department of Poultry Science, University of Maryland, College Park)
Feedstuffs 40, No. 8, 36, 38, 53 (February 24, 1968)

The increasing use of high-speed computers to determine economical feed formulations has emphasized the need for better quantitative information about the availability of those dietary essential amino acids that may be first limiting. Since the dietary levels of lysine and sulfur amino acids are frequent determinants in routine formulations of poultry rations, information about available lysine and available methionine is particularly needed.

This article describes a study conducted to improve the chick bioassay procedures used to determine the available lysine and available methionine content of protein supplements. It was designed in such a way that differences in food intake were taken into account. The authors made this improvement by relating the weight gain of each chick to the amount of available test amino acid each chick ate--but they expressed the amount in milligrams rather than, as is normally done, as a percent of the total diet. Thus differences in voluntary food consumption, regardless of the cause of the differences, did not materially affect the values for availability of the amino acids. The values found to be most useful were those expressed as available lysine or available methionine in terms of protein content--from these values, the values for other samples of similar ingredients can be approximated.

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 ABSTRACTER: L. Baldwin]

8.51 (*) A STUDY OF CERTAIN PROPERTIES OF MYOSIN FROM SKELETAL MUSCLE

Quass, D. W., and E. J. Briskey (Department of Meat and Animal Science, University of Wisconsin, Madison)
Journal of Food Science 33, No. 2, 180-187 (March-April 1968)

This investigation was conducted (1) to establish a procedure for purifying a stable myosin preparation from the skeletal muscle of pig and (2) to evaluate the enzymatic activity and associated characteristics of purified myosin that was isolated at death from skeletal muscles, which ultimately have varying rates of hydrolysis of adenosine triphosphate in situ during the first half hour after death. Rabbit muscles were used for comparative purposes.

The preparations of myosin were found to be pure by ultracentrifugation, Sephadex separation, and superprecipitation tests. The myosin preparations were stable with normal values for SH groups. The Ca^{++}-activated adenosine triphosphatase (ATPase) activities of myosin extracted from pale, soft, exudative skeletal muscle of Poland China pigs were significantly greater than those from Chester White pigs and normal Poland China pigs. Ethylenediaminetetraacetate (EDTA)-activated ATPase activities were greater in myosin from pale, soft, exudative Poland China pigs than in myosin from normal Poland China pigs. [40 references]

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 ABSTRACTER: L. Baldwin

8.53 (*) RELATION OF PHOSPHOLIPIDS TO OTHER TISSUE COMPONENTS IN TWO BEEF MUSCLES

Turkki, Pirkko R., and Ada Marie Campbell (Agricultural Experiment Station and College of Home Economics, University of Tennessee, Knoxville 37916)
Journal of Food Science 32, No. 2, 151-154 (March-April 1967)

The phospholipids of two beef muscles, psoas major from the loin and extensor carpi radialis from the fore shank, were compared for their relation to other tissue components. Concentrations of total lipid, phospholipid, deoxyribonucleic acid, and total nitrogen were determined for each muscle. The distribution of total nitrogen among the fibrillar protein nitrogen, sarcoplasmic protein nitrogen, nonprotein nitrogen, and stroma nitrogen was determined. The phospholipids were separated from neutral lipids and were fractionated by thin-layer chromatography into lecithin, cephalins, and sphingomyelin. The quantity of each class of phospholipids was estimated by phosphorus analysis.

The concentrations of total lipid and phospholipid were higher in the psoas major muscle than in the extensor carpi radialis muscle. The amount of phospholipid, deoxyribonucleic acid, total nitrogen, protein nitrogen, and fibrillar protein nitrogen also was higher in the psoas muscle than in the extensor muscle. The concentration of phospholipid, in terms of sarcoplasmic protein nitrogen, was similar in both muscles. In both muscles, lecithin accounted for about 62 percent of the lipids recovered, cephalins for 30 percent, and sphingomyelin for less than 10 percent. [23 references]

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 ABSTRACTER: M. F. Tripple

9.125 (*) THE TUNA: A WARM-BLOODED FISH

Anonymous
New Scientist 33, No. 530, 151 (January 19, 1967)

Zoologists at the Woods Hole Oceanographic Institute in Massachusetts have confirmed that tuna fish maintain a body temperature up to 14° C. higher than the temperature of their environment. The advantages of a relatively high body temperature are higher rates of digestion, nerve conduction, and muscle contraction. The zoologists speculate that the high body temperature allows tuna to attain swimming speeds of 42 miles per hour. The reason tunas are warm blooded, whereas other fish are cold blooded, is that a special heat-exchanger has evolved in the tuna. The heat-exchanger prevents the heat from metabolic processes being carried away through the gills to the blood stream.

Temperature measurements were made throughout the musculature of the tunas. The temperatures were found to be highest in the retia, the muscle behind the pectoral fin. Closely aligned, parallel blood vessels are arranged in the retia so that the arterial blood flows into the muscle in the opposite direction to the venous blood that flows out. The temperature gradient between the surface of the body and water is reduced, resulting in a reduction of heat loss by surface cooling.

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 ABSTRACTER: M. M. Gwin

8.51 AN ANTIGENIC SITE OF SPERM WHALE MYOGLOBIN

Crumpton, M. J. (Department of Immunology, St. Mary's Hospital Medical School, London, England)
Nature 215, No. 5096, 17-20 (July 1, 1967)

Definition of the structural characteristics of the antigenic sites of sperm whale myoglobin has revealed that the C-terminal heptapeptide, which represents a significant part of one of the sites, partly inhibits the precipitation of metmyoglobin and apomyoglobin by certain antisera to the metmyoglobin. To characterize the structure of the C-terminal antigenic site more precisely, the author has compared the inhibitory activities of a variety of C-terminal peptides.

The C-terminal 22 amino-acid peptide, which is predominantly helical in the native protein, contains at least one of the antigenic sites of the myoglobin. Although the C-terminal heptapeptides and the C-terminal hexapeptides are also immunologically active, they are less so than the 22 amino-acid peptide is. Since the inhibitory activities of the heptapeptides and the hexapeptides are similar, the N-terminal lysine residue of the heptapeptide probably does not form part of the C-terminal antigenic site. Whether or not the C-terminal hexapeptide represents a complete site or only part of a site is not clear. That one or both of the C-terminal amino-acid residues and the leucylglycyl sequence of the hexapeptide are included in the C-terminal antigenic site of the myoglobin is evident, however. The smallest inhibitory fragment isolated during the study was a pentapeptide that is a part of but less active than the C-terminal heptapeptide. [15 references] [Abstracter: L. Baldwin]

7.591 INSTRUMENTAL ASSAY OF MICROBIAL LIPASE AT CONSTANT pH

San Clemente, Charles L., and Dharam V. Vadehra (Department of Microbiology and Public Health, Michigan State University, East Lansing)
Applied Microbiology 15, No. 1, 110-113 (January 1967)

A rapid, accurate method with high sensitivity and reproducibility has been developed for the routine measurement of microbial lipase. This method has the advantage of a short incubation period under constant pH. The apparatus consists of a pH meter, a thermoelectric heating and stirring device, a motor-driven burette, and an automatic recorder, all of which are readily available and inexpensive instrumental components. The reaction mixture consists of 5 ml. of a 10 percent olive oil-gum arabic emulsion, 2 ml. of 3 M NaCl, 2 ml. of sodium taurocholate (15 mg. per ml.) of 0.075 M $CaCl_2$, 5 ml. of water, and 1 ml. of enzyme solution. The mixture is adjusted to pH 8.0 and 37° C. The pH is maintained at a constant value by automatic addition of 0.01 N NaOH during the incubation period, that usually lasts 5 min. A lipase unit, derived from use of this technique, may be defined as the number of microequivalents of acid that are liberated per minute under the specified conditions. The method is sensitive to 0.01 lipase units. Various organisms were tested and produced 0.17 to 1.32 lipase units per milliliter of the cell filtrate. An Arrhenius plot for staphylococcal lipase yielded 14,500 calories for energy of activation. [Abstracter: M. F. Tripple]

9.125 HABITUATION OF THE CRAYFISH ESCAPE RESPONSE DURING RELEASE FROM INHIBITION INDUCED BY PICROTOXIN

Krasne, Franklin B., and Alan Roberts (Department of Psychology and Department of Zoology, University of California, Los Angeles)
Nature 215, No. 5102, 769-770 (August 12, 1967)

If the posterior segments of the crayfish body are disturbed, the crayfish will often escape by darting backwards. This escape maneuver, in which the appendages are thrust forward and the tail is flexed, is mediated by two lateral giant axons that lie dorsolaterally in the nerve cord. An intriguing aspect of the reflex is its extreme lability; it invariably fails if an attempt is made to elicit it repeatedly. This phenomenon, reminiscent of habituation in higher forms, was the subject of an investigation.

The authors concluded that at least one class of central nervous inhibition does not cause the decrement of the beta component and the consequent habituation of the escape reflex of the crayfish's lateral giant fiber. The authors felt that the best hypothesis is that habituation of the crayfish escape reflex is caused by a depression intrinsic to the excitatory pathways of the reflex. Desensitization of postsynaptic membrane, depletion of transmitter, and depression of electrogenic processes in axonal or dendritic arborizations are salient as potential mechanisms of action. [16 references] [Abstracter: M. F. Tripple]

8.53 FATTY ACID COMPOSITION OF TURKEY MEAT AS AFFECTED BY DIETARY FAT, CHOLESTEROL AND DIETHYLSTILBESTROL

Chung, R. A., Y. C. Lien, and R. A. Munday (Department of Food Science and Technology, Tuskegee Institute, Tuskegee, Alabama 36088)
Journal of Food Science 32, No. 2, 169-172 (March-April 1967)

A study was undertaken of the fatty acid composition of the breast, thigh, and skin tissues of turkeys after different fat and cholesterol feedings and after diethylstilbestrol administration. Diethylstilbestrol increased the total lipid content of breast, thigh, and skin tissues of turkeys if either a corn oil or a hydrogenated coconut oil diet was fed. The effect of diethylstilbestrol, cholesterol, or the two in combination was greater with the coconut oil diet than with the corn oil diet. The total polyunsaturated acid content of the breast of turkeys fed the coconut oil control diet and the corn oil control diet was the same; however, the content of the thigh and skin lipids was greater in turkeys fed the corn oil control diet, possibly because of the greater linoleate concentration. The proportion of fatty acids was changed to a small extent by diethylstilbestrol, cholesterol, and a combination of the two. The weight of the fatty acids in a unit weight of turkey meat was greatly changed because of the effect on the total fat content and on the total fatty acid content. [23 references]
[Abstracter: M. F. Tripple]

9.125 VARIABILITY AND RELATIONS OF FISH VISUAL PIGMENTS

Bridges, C. D. B. (Univ. Miami School of Med., Miami, Florida)
Chemical Abstracts 63, 10361h (October 11, 1965)

8.53 EFFECT OF SOME BIOLOGICAL FACTORS ON THE FAT COMPOSITION OF CASPIAN SEAL

Magomaev, A. A.
Chemical Abstracts 66, No. 9, 35859b (February 27, 1967)

7.591 L-MALATE DEHYDROGENASE OF THE SEA URCHIN STRONGYLOCENTROTUS PURPURATUS

Ozaki, Hironobu, and Arthur H. Whiteley (Friday Harbor Labs., Friday Harbor, Washington)
Chemical Abstracts 68, No. 7, 27074t (February 12, 1968)

ANTIGENIC SITE OF WHALE MYOGLOBIN

MEASUREMENT OF MICROBIAL LIPASE
ANALYSIS OF DEHYDROGENASE IN SEA URCHIN

HABITUATION OF CRAYFISH ESCAPE RESPONSE
VARIABILITY OF FISH VISUAL PIGMENTS

FATTY ACID COMPOSITION OF TURKEY MEAT
FAT COMPOSITION OF CASPIAN SEAL

9.14 (*) THE NEEDS OF A FISH-FOOD

Anonymous
New Scientist 33, No. 535, 473 (March 9, 1967)

A shrimplike copepod, Macrostella gracilis, was found to grow best in the presence of small tufts of a filamentous blue-green alga, Trichodesmium thiebauti. The reason for this relation was that the larvae of M. gracilis are creeping forms that require a definite substrate on which to grow and live. To confirm the relation between copepod and alga, a study was conducted to determine whether distribution and abundance of the two organisms are correlated under natural conditions. Thirty-four sampling stations were set up off the northeast coast of South America. The distribution and abundance of copepods were estimated from plankton hauls; the abundance of algae was measured by filtering water samples.

The results show that usually the two organisms were equally abundant at most of the sampling stations. The copepod was not always present when the alga was, but only once was the copepod present in quantity when few algae were present. In general, this finding supports the hypothesis that the copepod depends almost exclusively on this particular alga for successful breeding. Because the algae are able to fix atmospheric nitrogen, this association must be an important factor in the food chain of tropical waters. The association is also important because copepods make up much of the food supply of fish and whales.

*Items on back of card.

ABSTRACTER: M. M. Gwin

9.19 (*) STUDIES ON ACCUMULATION OF HEAVY METALS IN AQUATIC ORGANISMS. II - ON ACCUMULATION OF COPPER AND ZINC IN OYSTERS

Ikuta, Kunio (Faculty of Agriculture, Miyazaki University, Miyazaki City, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 2, 112-116 (February 1968) (In Japanese; summary, tables, and figures in English)

Greening in oysters can be caused by accumulations of copper and zinc. Normal oysters were transplanted to an area where green oysters had been previously found, and the amount of copper and zinc the normal oysters accumulated while living for 125 days (from July to November 1965) in the abnormal environment was analyzed. (In the article, the "normal accumulation" of copper and zinc is that amount an oyster will metabolize under normal physiological conditions; the "abnormal accumulation" is that amount the oyster will metabolize when living in an abnormal environment; the "absolute abnormal accumulation" is the difference in the amount of copper and zinc normally accumulated and the amount abnormally accumulated.)

The analyses showed that (1) the quantity of copper that was abnormally accumulated increased exponentially ($\log Y = 1.4399 + 0.0069 X$), whereas the quantity of zinc that was abnormally accumulated increased sigmoidally. (2) The critical points for the absolute abnormal accumulation of both copper and zinc were noticeable by the 62nd day of the test. Regression lines were straight

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ABSTRACTER: L. Baldwin]

9.14 (*) STUDIES ON VITAMIN REQUIREMENTS OF RAINBOW TROUT. III - REQUIREMENT FOR VITAMIN A AND DEFICIENCY SYMPTOMS

Kitamura, Sasaburo, Tomio Suwa, Syuhei Ohara, and Kenichi Nakagawa (Oriental Yeast Co., 3-6-10 Azusawa, Itabashi-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 12, 1126-1131 (December 1967) (In Japanese; summary and tables in English)

The vitamin A requirements of rainbow trout fingerlings (Salmo gairdneri) were determined and the deficiency symptoms observed. Four groups of yolk-sac fry were kept for 6 months on diets containing 0, 0.5, 2.5, or 50 I.U. of vitamin A acetate per gram of dry ingredients. Avitaminosis was evident from the retarded growth, the high mortality, the low hepatosomatic index, and anemia. During the early part of the test, body color faded. This condition was followed by hemorrhaging in the eye and at the base of the fin and by a reverse bend of the gill opercula. Recovery diets were then fed to some of the fish. Within a few weeks, all the symptoms except the reversed gill opercula rapidly disappeared.

On the basis of the gain in body weight, the requirement for vitamin A was estimated to be more than 2.5 I.U. per gram of dry diet for fingerlings weighing less than 7 grams and 2.5 I.U. or less for larger fish. [9 references]

*Items on back of card.

ABSTRACTER: L. Baldwin

9.2 (*) SEVEN LEADING PRODUCTS WORTH 91.3% OF 1966 FROZEN SEAFOOD VALUE

Anonymous
Quick Frozen Foods 30, No. 3, 169-171 (October 1967)

The seven leading seafood products during 1966 were shrimp, breaded shrimp, rock lobster tails, fish fillets and fish steaks, fish sticks, and fish portions. These seven leading products accounted for 91.3 percent of the total value of seafoods in 1966. This percentage approaches the peak level of 92.8 percent, which was reached in 1963. In 1966, these seven products were valued at $940,473,318 out of a total value for all seafood of $1,029,402,101. The article states that the statistics for 1960 show that the seven leading seafood products that year generated 65.3 percent of the total value of seafoods.

The following table uses figures from the article recalculated to give a comparison between the 1960 and 1966 values for the seven leading seafood products and to give the approximate percent increase for each product during that time.

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ABSTRACTER: M. F. Tripple

ASSOCIATION OF COPEPOD AND ALGA

VITAMIN A REQUIREMENTS OF RAINBOW TROUT

ACCUMULATION OF COPPER AND ZINC IN OYSTERS

VALUE OF SEVEN LEADING SEAFOOD PRODUCTS, 1966

9.14 (Cross References: 1.37, 5.1)

STUDIES ON VITAMIN REQUIREMENTS OF RAINBOW TROUT.
II - THE DEFICIENCY SYMPTOMS OF FOURTEEN KINDS OF VITAMIN

Kitamura, Sasaburo, Tomio Suwa, Syuhei Ohara, and Kenichi Nakagawa (Oriental Yeast Co., 3-6-10 Azusawa, Itabashi-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 12, 1120-1125 (December 1967) (In Japanese; summary and tables in English)

During a study of the vitamin requirements of rainbow trout (Salmo gairdneri) vitamin A, D2, K1, B1, B2, B6, B12, C, niacin, pantothenic acid, inositol, folic acid, biotin, and choline were individually eliminated from the diet of fingerlings. Elimination of niacin, biotin, and B12 produced no deficiency symptoms. All the others produced symptoms that coincide fairly well with the symptoms reported by previous workers. [15 references] [Abstracter: L. Baldwin]

9.2 AN INTEGRATED FISHING INDUSTRY - STUDY AND IMPLEMENTATION

Toussaint, J. F.
French Tech. Bull., No. 1, 6-13 (1967)
Food Science Abstracts 1, No. 7, Abstract No. 67/855, p. 316 (July 1967)

Discussed are the points that must be considered when a fishing and fish-processing industry are set up. Many failures have occurred when a complete study of the whole organization has not been made before the plants are started; for example, a fishmeal plant should be included. Losses may be due to rejection of fish with poor marketing value, to inadequate preservation, or to throwing away material that could be used.

9.14 THE MODE OF NUTRITION OF FISH AND ITS INFLUENCE ON THE QUALITY OF THE FISH FLESH

Rakow, D.
Arch. Lebensmitt. Hyg. 14, No. 11, 261-263 (1963) (Hannover) (In German)
Abstracts from Current Scientific and Technical Literature 17, Abstract No. 893, p. 173 (April 1964)

Seasonal variations in the quality of sea fish are caused, to a large extent, by the mode of nutrition. Factors affecting nutrition of various kinds of fish are briefly considered.

9.14 EFFECT OF IRON ON THE GROWTH RATE OF FISHES

Roeder, Martin, and Rachel H. Roeder (Department of Biological Science, Florida State University, Tallahassee)
Journal of Nutrition 90, No. 1, 86-90 (September 1966)

The effect of a daily addition of supplemental ferrous sulfate on the growth of the swordtail (Xiphophorus helleri) and the platyfish (Xiphophorus maculatus) was measured by determining the weight gain and hematocrit levels of the fish. Both weight gain and hematocrit levels increased as a result of the added iron. The ferrous sulfate treatment led to the increase in growth rate, even though the fish were fed maximally with live brine shrimp. The effectiveness of the additional iron diminished as sexual maturity was approached. Addition of the ferrous iron significantly decreased the mortality from hatching to maturity.
[Abstracter: M. F. Tripple]
[9 references]

9.2

Increased value of frozen seafoods between 1960 and 1966

Product	1960 value (Dollars)	1966 value (Dollars)	Increase (Percent)
Shrimp	135,785,000	356,887,953	163.0
Breaded shrimp	48,000,000	134,525,439	180.0
Rock lobster tails	40,370,000	90,422,294	124.0
Fish fillets and fish steaks	36,848,000	208,169,147	465.0
Fish sticks	42,220,000	58,920,406	40.0
Fish portions	23,500,000	91,548,079	290.0
Total	326,723,000	940,473,318	188.0

9.19 DISTRIBUTION OF KRAFT MILL EFFLUENT IN A BRITISH COLUMBIA HARBOUR

Werner, A. E., and W. F. Hyslop (Fisheries Research Board of Canada Biological Station, Nanaimo, British Columbia)
Journal of the Fisheries Research Board of Canada 24, No. 10, 2137-2153 (October 1967)

Concentrations of kraft mill effluent in Alberni Harbor, British Columbia, were measured by optical methods after a period during which no effluent had been discharged, during the influx of effluent into the almost-clean harbor, and after a year of regular effluent discharge. A formula was developed to estimate the concentrations. In addition to the mill, the city sewer contributed to the color of water in at least one area. The transient pattern of effluent patches, which formed when the mill resumed operations, was followed from the sewer outfall to a hydraulic model of Alberni Harbor. Effluent concentrations after a year of normal operation were recorded, and their distribution obtained several miles down the inlet. The pattern resembled the distribution obtained over and under these points. Normal accumulation seems to influence the variation in the quantity of absolute abnormal accumulation. (3) Absorption and accumulation of copper by oysters is not the same as for zinc--each of these metals has its own peculiar mechanism in the metabolic process. [10 references]

[Abstracter: A. Reed]

9.19

over and under these points. Normal accumulation seems to influence the variation in the quantity of absolute abnormal accumulation. (3) Absorption and accumulation of copper by oysters is not the same as for zinc--each of these metals has its own peculiar mechanism in the metabolic process. [10 references]

9.14 BIOCHEMICAL STUDY OF TROUT (SALMO GAIRDNERII). IMPORTANCE OF THE USE OF DRY FORAGE AND ITS SUPPLEMENT BY TRACE ELEMENTS; THEIR EFFECT ON THE GROWTH AND DEVELOPMENT OF THE FISH AND ON HEMOGLOBIN CONTENT

Jurca, Valentina, and Dumitru Matei (Univ. Al. I. Cuza, Jassy, Rumania)
Chemical Abstracts 68, No. 7, 27789e (February 12, 1968)

9.2 (*) FROZEN LOBSTER TAILS AND SCALLOPS HIT RECORD PRICE LEVELS DURING 1967

Anonymous
Quick Frozen Foods 30, No. 6, 101-103 (January 1968)

Average annual changes in seafood prices, 1961-1967

Seafood product	Changes in prices of seafood sold: At retail (percent per year)	To institutions (percent per year)
Frozen lobster tails	9.7	6.2
Frozen scallops	7.7	6.5
Frozen shrimp	7.8	6.0
Breaded shrimp	6.9	9.8
Fish steaks	8.1	9.5
Fish fillets	3.7	4.5
Fish portions	3.7	4.5
Fish sticks	1.0	5.2
Frozen crab meat	-0.8	-1.9
Langostinos	9.5	6.8
Frozen oysters	2.4	2.7
Clams	-0.5	5.5
Frozen trout	1.8	4.8

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 ABSTRACTER: M. F. Tripple

9.6 FISH PROCESSING [VINNSLA SJÁVARAFLA]

Congress on Fish Processing, Reykjavik, May 1967
Vinnsla sjávarafla (Fish Processing), 336 pp. Published by the Association of Chartered Engineers in Iceland, P.O. Box 645, Reykjavik, Iceland (1967). Icelandic kr. 1000.00

Fish Processing is a compilation of 24 papers presented in May 1967 at a congress on fish processing sponsored by the Association of Chartered Engineers in Iceland. Twenty-one of the papers are in Icelandic with English summaries; the other three are in English with Icelandic summaries. The book contains 68 figures, 74 tables, and 266 references. Also included are 14 tables, with headings and subheadings in Icelandic and English, illustrating fishery production, gross fixed asset formation, fixed capital assets, and the fishing industry of Iceland. These tables were compiled by The Economic Institute, Reykjavik.

The papers are as follows:

Opening address, by T. Thorbjarnarson.

Main stocks of fish in Icelandic waters and the influence of the catch on them, by J. Jónsson.

Crustaceans and molluscs, by U. Skúladóttir.

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 ABSTRACTER: Páll Ólafsson

9.6 (*) PACIFIC SALMON LITERATURE COMPILATION--1900-59

Anonymous
Pacific Salmon Literature Compilation 1900-59 (1967) (Clearinghouse for Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151)

This 108-volume compilation contains 1,406 reports (17,895 pages) that were published in the 60-year period 1900-59. It covers the five species of North American salmon indexed under 4,000 subject categories. The reports have been published on 4- by 6-inch microfiche cards; the set of 645 microfiche sells for $185.00. This price includes a copy of the Instruction and Index book and the mailing costs.

Orders for either the Instruction and Index book, which may be purchased separately for $3, or for the full set of microfiche should be addressed to: Clearinghouse for Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151.

Orders should refer to the Clearinghouse's accession numbers. The number for the Instruction and Index book alone is PB 174101; for the full set of fiches including the book, PB 174102.

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 ABSTRACTER: L. Baldwin

9.6 (*) ESTUARIES

Edited by George H. Lauff (AAAS, Washington, D.C.)
Papers presented at a symposium held at Jekyll Island, Georgia, March-April 1964, 773 pp. (1967) Price $27
Reviewed by James T. McFadden (Department of Wildlife and Fisheries, University of Michigan, Ann Arbor)
Science 157, No. 3789, 672-673 (August 11, 1967)

Following a symposium held at Jekyll Island, Georgia, in the spring of 1964, 71 of the papers presented were collected into this book. Of particular concern to the commercial fisheries are those that deal with the physiological problems affecting estuarine animals, the importance of estuaries to fisheries in various parts of the world, the potentials for increased production, and the detrimental and beneficial interventions by man (this last in terms of pollution, the land drainage, tidal influences, and direct alterations of the biota). The reviewer expresses regret that the relevance of the estuarine situation to the general one is not clearly established--for example, it is not clear to what extent sedimentation processes, population dynamics, and strategies for management of harvestable biological resources represent problems unique to estuaries rather than particular instances of a general problem.

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 ABSTRACTER: L. Baldwin

9.6 FOOD MAY BE POISONOUS

Anonymous (Monograph prepared by individual scientists)
Toxicants occurring naturally in foods, Publication No. 1354, 301 pp. (1966) (National Academy of Sciences, National Research Council, Washington, D.C.) Price $6
Reviewed by R. T. Williams
Nature 213, No. 5097, 218-219 (July 8, 1967)

The avowed purpose of this book is to present information concerning the presence of naturally occurring toxic substances in man's food. In doing so, it assembles 27 articles, each with a bibliographical supplement, written by 25 contributors. About two-thirds of the material deals with organic compounds, many of which have toxicological and pharmacological properties--for example, some of the fish poisons. The authors point out that the normal detoxication mechanisms of the body of a normal person eating a reasonably balanced diet will usually be able to cope with these toxicants. However, in instances when the protective mechanism is defective, when the diet is limited, when the food is gathered and eaten during the toxic phase of its growth, or when two groups of toxicants are ingested simultaneously, poisonings may occur. In this last instance, the problem was cited of patients who, while undergoing treatment with monoamine oxidase inhibitors, experienced hypertensive crises following ingestion of foods rich in presser amines--for example, those in pickled herring or in certain cheeses, wines, or beans. [Abstracter: L. Baldwin]

9.6 THE WORLD OF SHIPS

Lewis, Edward V., and Robert O'Brien
Ships, 200 pp. (Time-Life International) 35s
Reviewed by A. Silverleaf
New Scientist 35, No. 565, 43-44 (October 5, 1967)

By describing the ways in which ships of today are designed, constructed, and used, this book gives an account of the physical evolution of seagoing vessels over the ages. It begins with an outline of the principles of buoyancy, stability, and strength and then discusses the ideas that guide the designer. A chapter on special-purpose ships describes modern methods of cargo handling, particularly new shore facilities for rapidly loading and discharging cargo in containers. The last part of the book deals with such topics as navigation and navigational aids. The last chapter describes recent efforts to extend nautical frontiers by the introduction of high-speed hydrofoil ships and hovercraft and of very low-speed deep submersibles. Each chapter is followed by a "supplementary picture essay." [Abstracter: L. Baldwin]

9.7 THE ART OF TALKING ABOUT SCIENCE

Bragg, Lawrence
Science 154, No. 3757, 1613-1616 (December 30, 1966)

The basic principles of giving a talk are reviewed and the characteristics that differentiate a successful talk from a good written report are emphasized. The criterion of success is: Can the average member of the audience remember it next day? [Abstracter: L. Baldwin]

9.2

Seafood price levels, 1966-1967

Seafood product	Price per pound of seafood sold			
	In 1966		In 1967	
	Retail	To institutions	Retail	To institutions
	(dollars)	(dollars)	(dollars)	(dollars)
Frozen lobster tails	$2.64	2.44	3.13	2.87
Frozen scallops	1.01	.92	1.09	.94
Frozen shrimp	1.69	1.57	1.74	1.61
Breaded shrimp	1.39	1.25	1.43	1.27
Fish steaks	.98	.95	.98	.94
Fish fillets	.69	.60	.65	.56
Fish portions	.69	.60	.65	.56
Fish sticks	.74	.55	.74	.55
Frozen crab meat	1.80	1.72	1.99	1.89
Langostinos	1.78	1.50	1.79	1.53
Frozen oysters	1.37	1.10	1.40	1.20
Clams	1.50	1.38	1.55	1.40
Frozen trout	1.00	1.00	1.00	1.00

9.19 IN VIVO UPTAKE OF RADIOIODIDE BY RAINBOW TROUT

Hunn, J. B., and P. O. Fromm (Michigan State Univ., East Lansing)
Chemical Abstracts 66, No. 11, 44115h (March 13, 1967)

9.6

Position of fishing and fishing industry in the economy, by J. H. Haralz.
Sanitation and sanitary problems in the production of frozen fish, by G. Hannesson.
Transportation of herring, by H. Asgeirsson.
Preservation and handling of the raw materials of the fishing industry, by H. Einarsson.
Changes in frozen fish during storage, by R. M. Love.
Achievements of the freeze-drying industry, by E. Petersen.
Productive activities in the processing of fish; Incentive bonus systems, by H. G. Thordarson and O. Gunnarsson.
Freezing on board fishing vessels, by S. B. Haraldsson.
Canning of sterilized and semipreserved products, by S. H. Pétursson.
The saltfish industry of Iceland, by L. Loftsson.
Stockfish production, by S. B. Haraldsson.
Herring salting, by J. Gudmundsson.
The development of the production of fish meals and fish body oils, by V. Gudmundsson.
Cod-liver oil and cod-liver rendering, by T. Thorbjarnarson.
Refining and hydrogenation of fish oils, by P. Ólafsson.
Utilization of fish oils, by G. Arnesen.
Utilization of fish viscera, by G. Arnesen and H. Einarsson.
Capelin, sand eel, and Norway pout as raw materials for fish reduction plants, by T. Thorbjarnarson.
Optimization in herring industry and herring fishing, by Th. Th. Sigurdsson.
Epilogue, by H. Gudmundsson.

0.38 (*) ENZYMATIC REDUCING PATHWAYS IN MEAT

Watts, Betty M., Jean Kendrick, Marelynn W. Zipser, Bobbie Hutchins, and Bassima Saleh (Department of Food and Nutrition, Florida State University, Tallahassee 32306)
Journal of Food Science 31, No. 6, 855-862 (November-December 1966)

This article describes methods for measuring reducing capacity of meats, including changes in oxidation-reduction potentials of ground meat and changes in oxygen tension of meat slurries, as well as reduction of metmyoglobin. All reductive activity in meat can be stopped by inhibitors of the reduced state of diphosphopyridine nucleotide (DPN) oxidation via the electron transport chain, except for a small residual utilization of oxygen in meat slurries promoted by nonenzymatic oxidation. Added DPN accelerates all reductive activity. Reduction of metmyoglobin does not occur until the oxygen has substantially disappeared from the meat.

Because meat contains little or no succinate, added succinate greatly accelerates oxygen utilization. The added succinate affects metmyoglobin reduction only indirectly by more rapidly establishing anaerobic conditions. The authors concluded that both oxygen utilization and metmyoglobin reduction in meat are normally promoted by DPN. [21 references]

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2.115 (*) MANOEUVRABILITY OF CONVENTIONAL PROPELLER AND RUDDER VERSUS STEERABLE DUCTED PROPELLER

English, J. W.
National Physical Laboratory (Ship Division) Technical Memorandum No. 28 (June 1963)
World Fisheries Abstracts 16, No. 3, 13-14 (July-September 1965)

Model experiments were performed to determine whether a ship having a conventional single screw and an unbalanced rudder could be fitted with a steerable ducted system--that is with a pivoted nozzle round a fixed-axis propeller without the existing steering machinery being altered. The propeller models used were the ducted U299 and the conventional U280, which were considered to be reasonable models (except for the pitch ratio of the ducted model) of proposed and existing full scale propulsion and steering devices. The rudder-head torque on both arrangements was measured at the same ship speed and with the same sideways maneuvering force on the rudder and on the duct. Experimental details are given, and the results are presented graphically. For maneuvering, the ducted propeller was found to be appreciably superior to the conventional unbalanced rudder.
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2.05 (*) ISOLATIONS OF ORGANISMS RELATED TO VIBRIO PARAHEMOLYTICUS FROM AMERICAN ESTUARINE SEDIMENTS

Ward, B. Q. (Division of Fishery Sciences, Institute of Marine Sciences, University of Miami, Florida 33149)
Applied Microbiology 16, No. 3, 543-546 (March 1968)

Dack (1966) suggested that organisms of significance in other parts of the world should be considered as possible causes in outbreaks of food-borne disease of unrecognized causes in America. Dack's hypothesis was supported by the observation that Clostridium botulinum had not been detected in many areas because of lack of an organized search (Ward, 1965; 1966; and 1967).

Frozen sediment samples from two coasts of the United States were thawed, cultured, and subjected to a number of differential tests. The cultures were also tested serologically with diagnostic antisera for Vibrio parahemolyticus from Japan. On the basis of the results, the author concluded that the American isolates were related to the Japanese organisms; however, problems of antigenic intermediacy and new serotypes, problems of physiological and cultural differences, and problems of degrees of pathogenicity remain to be examined. The possibility of a complex of relations is possible. [Abstracter: M. F. Tripple]

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2.3 (*) FACTORY SANITATION -- BUILDINGS

Anonymous
Indian Fisheries Bulletin 11, No. 3, 22-24 (July 1964)

These recommendations, made by the Central Institute of Fisheries Technology, cover most of the points usually made by engineers for constructing a pestproof, clean, easily maintainable plant. They add several points that are not commonly made. For example, a great deal of attention is paid to the comfort and safety of the workers--locating the building in an east-west direction to protect employees from the direct sun and roughening cement floors so the workers are less likely to slip. Specific suggestions are made about the material and structure of the roof, about orienting the building so that prevailing winds won't blow dust into the plant, about how to repair cracks and crevices in walls, and about the exact slope of the floor to provide adequate drainage without causing the water to run away so fast it will not allow for proper cleaning.
*Items on back of card. [Abstracter: L. Baldwin]

2.02 NUCLEOTIDE DEGRADATION, MONITORED BY THIN-LAYER CHROMATOGRAPHY, AND ASSOCIATED POSTMORTEM CHANGES IN RELAXED COD MUSCLE

Fraser, Doris ~ , J. R. Dingle, J. A. Hines, Sandra C. Nowlan, and W. J. Dyer (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 24, No. 8, 1837-1841 (August 1967)

Cod muscle, which was relaxed at death and contained high initial levels of creatine phosphate and adenosine triphosphate (ATP), and very low levels of lactate, maintained its elevated level of ATP during iced storage to 24 hr. post mortem. As a result of the high level of ATP, nucleotide catabolism, glycolysis, and onset of rigor were delayed. The thin-layer chromatographic procedure described in this report proved to be a useful qualitative and semiquantitative method for following the pattern of nucleotide degradation quickly and easily. [15 references] [Abstracter: M. F. Tripple]

2.8 PROTEIN CHANGES RELATED TO HAM PROCESSING TEMPERATURES I - EFFECT OF TIME-TEMPERATURE ON AMOUNT AND COMPOSITION OF SOLUBLE PROTEINS

Cohen, Edward H. (Eastern Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, Pennsylvania 19118)
Journal of Food Science 31, No. 5, 746-750 (September-October 1966)

A knowledge of protein changes caused by heat is necessary for the development of an analytical method for determining whether canned meats have been pasteurized at sufficient temperatures. Ground, cured, uncooked ham was heated with different programming to temperatures up to 165° F. The influence of the treatments on the amount and composition of proteins soluble in 0.9 percent NaCl solution was determined. Both rate of heating and temperature reduced the amount of extractable protein. Fractionation of soluble proteins with disc electrophoresis showed five components to be relatively resistant to heat coagulation. One of the five components was identified as an acid phosphatase. [17 references]
[Abstracter: M. F. Tripple]

2.8 CUT FRYING OIL COST $850/MONTH

Improvements are effected when the heating system for flash-frying oils consists of electrically heated, heat-transfer fluid pumped through coils immersed in the oil. A diagram of the heat transfer system with illustrations of some of its sections is given. The saving in oil costs is considerable, since the oil is not discarded.

Gelber, P.
Food Science Abstracts 2, No. 4, Abstract No. 68/430, p. 149 (April 1968)

2.05 INTRACELLULAR LOCALIZATION AND PROPERTIES OF TRIMETHYLAMINE-N-OXIDE REDUCTASE IN VIBRIO PARAHAEMOLYTICUS

Umemoto, Tsutomu, Maki Hayashi, Komei Miyaki, and Makoto Hayashi (Univ. Chiba, Japan)
Chemical Abstracts 64, 2335f (January 17, 1966)

0.39 PROTEIN CARBONYL BROWNING SYSTEMS: A STUDY OF THE REACTION BETWEEN GLUCOSE AND INSULIN

Tannenbaum, S. R. (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139)
Journal of Food Science 31, 53-57 (January-February 1966)

The interaction between glucose and insulin in the dry state was studied at a comparatively low glucose concentration through the use of carbon-14-labeled glucose. [Abstracter: M. F. Tripple]

2.117 (Cross Reference: 2.119)

MARSHAL'S REPORT ON ESSEX FIRE OF VALUE TO OWNERS OF BOATYARDS

Anonymous
National Fisherman 48, No. 12, 20A (March 1968)

In January 1968, a large Connecticut boatyard was totally destroyed by fire. This summary of the Connecticut Fire Marshal's report of the causes of the fire provides a detailed check-off list of the safety items that boatyard personnel should be continuously aware of. Broadly, these items cover operating procedures, types of material used, storage procedures, personnel restrictions, plant layout, and liaison with local fire and water officials.

One item of incidental information that was developed by the report may be particularly significant: although all the metal fuel tanks on the 98 yachts stored in the yard were either ruptured or severely damaged, two of fiberglass-reinforced plastic were practically unscathed. One of the tanks (a 180-gal. tank) was three-fourths full of gasoline after the fire; the other, an 80-gal. tank, had a small amount of gasoline in it after the fire. The boats these tanks were in were both of fiberglass; both were totally consumed by the fire.

An explanation of this phenomenon could have an important influence on the design of future fuel tanks. It may be that the thermal insulation value of fiberglass-reinforced plastic is so far superior to that of metal that this material can be used to help prevent tank failure and the subsequent release of dangerous fuel during fires. [Abstracter: L. Baldwin]

0.38 THE ADENOSINETRIPHOSPHATASE ACTIVITY OF THE MEROMYOSINS

Muhlrad, A., S. Bosko, and N. A. Biro (L. Eotvos Univ., Budapest, Hungary)
Chemical Abstracts 66, No. 11, 43900y (March 13, 1967)

0.38 COMPARATIVE STUDIES OF DIPEPTIDASE ACTIVITY IN FISH TISSUES

Schmitt, A., G. Siebert, and I. Botke (Johannes-Gutenberg Univ., Mainz, Germany)
Chemical Abstracts 66, No. 3, 10026r (January 16, 1967)

SPOILAGE
ORGANIC COMPOSITION
CHEMISTRY AND BIOCHEMISTRY

COOKERY

SAFETY AT SEA

2.9 ALGAL TOXINS
(*)
Anonymous
Nature 216, No. 5118, 851-852 (December 2, 1967)

Algae cause the fresh-water and salt-water toxic blooms and red tides that present hazards to health. Some algal toxins are among the most potent known; for instance, the toxin of Gonyaulax catenella has a lethality approaching that of botulin. Despite all this, algal toxins have received little attention and very few algal toxins have been chemically characterized.

The toxin of G. catenella is a substituted purine, whereas the toxin of Microcystis aeruginosa produces a cyclic polypeptide toxin containing D-serine. The mode of action of these substances involves the blocking of axonal and muscle conduction by disturbing sodium or calcium conductance. It might be profitable to use these substances as tools in the investigations of excitable membranes and to evaluate their possible antibiotic activities.

Investigators in Jerusalem have selected the halophilic chrysomonad Prymnesium parvum as a model system because it is an alga that produces an exotoxin complex responsible for high fish mortality. Toxic effects include hemolysis, disturbance of gill permeability, and cytopathogenicity. Less well-defined toxic components induce numerous pharmacological activities in nerve and muscle preparations. One of the most interesting and intensively investigated toxins of Prymnesium is ichthyotoxin. Ichthyotoxin induces marked and rapid changes in gill permeability and sensitizes fish to other nonspecific poisons. [Abstracter: M. F. Tripple]

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3.231 FOOD PROCESSORS GO SUPER-COLD WITH LIQUID NITROGEN
(*)
Anonymous
Food Technology 21, No. 1, 23 (January 1967)

Two systems that use liquid nitrogen for ultrarapid freezing of food on the processing line are reviewed. Freezing with these machines is so rapid that undesirable changes in food texture and flavor do not occur. The systems function efficiently and compatibly with in-line process equipment.

One of the systems is a four-zone tunnel system, which has a chain-edge conveyor belt for the food being frozen to travel on. Nitrogen consumption in this system has been substantially lowered and freezing efficiency has been maximized through a combination of transverse and parallel gas flow, which is achieved with circulating fans. A remote-control panel has controls for belt drive, belt speed, and fan motors, and indicators give temperature readout from monitors placed at various locations. Commercial application in a seafood-processing plant and use in institutions that feed products of this system have proven to be very successful.

In the second system, foods are frozen with liquid nitrogen inside a vacuum-insulated stainless-steel process chamber. This system can be varied to provide freezing capacity of 1,000, 2,000, or 3,000 pounds per hour. The present users of this system include bakeries and processors of meat, fish, and poultry.
[Abstracter: M. M. Gwin]

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3.12 ANTIBIOTICS IN FOODS -- NATURALLY OCCURRING, DEVELOPED AND ADDED
(*)

Marth, E. H.
Residue Rev. 12, 65-161 (1961)
Food Science Abstracts 1, No. 7, Abstract 67/948, p. 348 (July 1967)

The presence of naturally occurring antibiotics in a number of foodstuffs has been recognized for some time. Work carried out on such antibiotics in fruits, cereals, vegetables, spices, egg white, milk, and honey is reviewed, and the bacteria killed are listed. Many antibiotics (for example, nisin) are produced in foodstuffs during processing. The production, properties, and uses of nisin are considered in some detail. Other antibiotics are added to foods as preservatives. Those added to fruits, vegetables, eggs, meats and meat products (including fish and other seafoods), milk, and milk products are given, together with the particular purpose of each. A considerably extensive bibliography is appended.

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3.12 FREEZE-DRIED FISH. V - EFFECT OF PRETREATMENT ON THE RECONSTITUTION OF FREEZE-DRIED FISH

Ueoka, Yasunobu, Hiroyasu Oka, Hidemichi Suemitsu, and Takeshi Sugimoto (Ehime Collective Chem. Ind. Guiding Sta., Matsuyama, Japan)
Chemical Abstracts 62, No. 1, 2233k (July 3, 1967)

3.2385 DETERMINATION OF EXTRACTABLE SUBSTANCES IN FOOD PACKAGING MATERIALS
(*)

Garlock, E. A., and O. E. Paynter
Residue Rev. 10, 40-69 (1965)
Food Science Abstracts 1, No. 7, Abstract No. 67/904, p. 333 (July 1967)

A review is given of work carried out on the additives that are extracted from the packaging material by some components of the packaged foodstuff. When the Food Additives Amendment to the Food and Drug Administration regulations was passed, it became necessary to develop satisfactory methods for analyzing packaging materials. Tests must be carried out on paper, paperboard, plastic materials, and the components of cans. These tests must extract any components that could be extracted by the foodstuff, identify these, and test them for safety. The effects of irradiation on packaging materials must also be tested. The selection of solvents having properties similar to those in the foodstuffs is considered. Some of the tests carried out are described; diagrams of the apparatus used and tabulated results are also presented. [15 references]

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3.12 PROPIONIC ACID AS A FISH PRESERVING ADDITIVE

Anonymous
Central Institute of Fisheries Technology (Ernakulam, India)
Indian Fisheries Bulletin 11, No. 4, 18-19 (October 1964)

The effectiveness of propionic acid in preserving sardines, mackerel, catfish, shark, and prawns that had been wet salted, dry cured, pickled, or semi-dried was studied. Results showed that fish pretreated with the acid kept well for 6 months without visible signs of attack by fungi or halophilic microbes; the controls spoiled within 2 weeks. Even lightly salted mackerel kept for over 6 months.

Although the propionic acid treatment effectively prevented mold and microbial spoilage in cured fish, it did not retard the development of rancidity. Incorporating butylhydroxyanisole (BHA) in the propionic acid treatment gave encouraging results with pickled sardines. A mixture of BHA, sodium propionate, and finely powdered sodium chloride applied to dry- and wet-cured fish after the usual salting also showed promise as a preservative. The advantage of this latter treatment is that smaller quantities of propionate are required. Tests on catfish, prawns, and mackerel showed that the proportion of propionate in the sprinkling mixture should be at least 2 percent to prevent fungal attack. The shelf life of samples of sardine, mackerel, and catfish treated with this mixture versus untreated samples was as follows: dry-cured sardines, 9 months vs. 2 months; wet-cured sardines, 4 months vs. 2 weeks; dry-cured mackerel, 4 months, vs. 2 months; wet-cured mackerel, 4 months vs. 2 weeks; and dry-cured catfish, 6 months vs. 4 months. [Abstracter: L. Baldwin]

3.2385 LIMITATIONS IN THE USE OF PACKAGING MATERIALS FOR FOODSTUFFS

Robinson, L., and R. Heiss
Verpackungs Rundsch. 17, No. 6, Suppl., pp. 41-46 (1966)
Food Science Abstracts 1, No. 7, Abstract No. 67/905, p. 333 (July 1967)

Packaging materials may possess the following undesirable qualities: (1) contain substances that migrate to foodstuffs and alter the flavor of the food; (2) lose some component, which changes their properties and makes them unsuitable as food containers; (3) be permeable to flavoring substances; and (4) remove a substance from the foodstuffs, which changes the properties of the package, for instance, some natural oils in foods act as plasticizers for the packaging film. Therefore packaging materials must be tested in contact with the foods they are to contain. [16 references]

3.238 FOOD PACKAGING

Selby, J. W.
Reprs. Progress Appl. Chem. 51, 378-392 (1966)
Food Science Abstracts 2, No. 3, Abstract No. 68/332, p. 113 (March 1968)

This review covers the work that has been published on packaging foodstuffs in cans, glass bottles, aerosol containers, flexible film, and laminated materials. The suitability of each for its purpose is included. The packaging of the following specific foods is also reviewed: fish, meat, vegetable products, freeze-dried foods, and dairy products. [About 300 references]

2.9 BIOLOGICAL EVALUATION OF CRAB MEAT (SCYLLA-SERRATA) IN THE RAT

Gangal, S. V., and N. G. Magar (Department of Biochemistry, Institute of Science, Bombay 1, India)
British Journal of Nutrition 21, No. 1, 1-6 (1967)

It has been claimed that the proteins of crab meat are as effective as proteins of beef and are superior to casein in promoting growth of rats; however, assessments of the biological value of different preparations of crab meat indicate that the quality of the protein varies. The work presented was conducted to assess the protein quality of meat of a commercially important Indian species of crab, Scylla serrata. The authors used protein-depleted rats to assay the meat of Scylla serrata for the quality of its protein. The crab meat and casein had the same biological value of 88. However, the crab meat supported a higher growth rate in rats than casein did. [Abstracter: M. F. Tripple]

2.9 SEAFOOD TOXINS

Mills, J. H., Jr.
Chemical Abstracts 67, No. 1, 1803j (July 3, 1967)

2.9 NUTRITIONAL AND DIETETIC VALUE OF RAW FILLETS

Lefevere, Sylvain (Inst. Roy. Sci. Naturelles Belgique, Brussels, Belgium)
Chemical Abstracts 66, No. 13, 53389c (March 27, 1967)

3.231 LOW TEMPERATURE APPLICATIONS OF RIGID POLYURETHANE FOAMS

Butterworth, H. W.
Appl. Plastics 10, No. 3, 28-35 (1967)
Food Science Abstracts 1, No. 7, Abstract No. 67/955, p. 350 (July 1967)

The demand for expanded rigid polyurethane insulation is considered. Many applications of this material are given: prefabricated panels containing the insulation are used for the construction of cold storage units; and the insulation is used in refrigerated cargo vessels, deep-freeze trawlers, refrigerated vehicles, and refrigerated containers. The properties of available systems, particularly the thermal properties, are given.

3.2344 A METHOD OF PRODUCING FROZEN FISH FILLETS OF FLATFISH SUCH AS PLAICE

British Patent 1,008,624
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 248, p. 48 (January 1966)

Fillets are cut from above and below the bone, drained till moist, placed inner sides together, compressed to expel air, and deep frozen at -35° C. for about 2 hr. to form what is essentially a boneless fish. It is claimed that liquid content, nutritional value, and taste are similar to those of fresh plaice.

3.2385 (*) INFLUENCE OF PRE-DISPLAY TEMPERATURE AND MUSCLE FIRMNESS ON MICROFLORA AND SENSORY ATTRIBUTES OF PREPACKAGED BEEF

Stringer, W. C., and H. D. Naumann (Department of Animal Husbandry, University of Missouri, Columbia 65202)
Food Technology 20, No. 11, 108-110 (November 1966)

Firm and soft beef loins were cut into steaks and held at 35°, 55°, and 75° F. for 3 hr. before they were packaged in cellophane. The packages were then displayed at 38° F. under 65 foot-candles of light. One half of the steaks were treated with oxytetracycline.

Neither the holding temperatures nor the muscle firmness had any significant effect on the shelf life of the packaged beef. The steaks treated with oxytetracycline had a shelf life that was at least 2 days longer than that of the untreated steaks. Predisplay temperature, length of storage, and antibiotic treatment affected the weight loss during storage. [10 references]

[Abstracter: M. F. Tripple]

*Items on back of card.

4.14 (*) LIPIDS FROM SPINAL CORD OF SPERM WHALE. I - FRACTIONATION OF WAX AND GLYCERIDE FROM THE SPERM SPINAL CORD

Hatano, Mutsuo, Kōichi Zama, Hyonsobb Shin, and Hisanao Igarashi
Bulletin of the Faculty of Fisheries Hokkaido University 17, No. 4, 207-214 (March 1967)

Oil obtained from the spinal cord of the sperm whale was fractionated by the following methods: (1) solvent fractionation by various organic solvents, (2) urea adduct method, (3) elution chromatography using the mixture of silica gel and celite as adsorbent, and (4) fractional distillation under reduced pressure. In comparing the results, the authors found that solvent fractionation and the urea adduct method were not good for separating the wax and glyceride fractions. Elution chromatography and fractional distillation, however, seemed to give almost complete results. [11 references]

[Abstracter: M. M. Gwin]

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3.60 (*) SELECTED WRITINGS ON FREEZE-DRYING OF FOODS

Bird, K.
U.S. Dept. Agric. Econ. Res. Serv. Mktg. Econ. Div., ERS-147, 52 pp. (1964)
Abstracts from Current Scientific and Technical Literature 19, No. 7, Abstract No. 1766, p. 326 (July 1966)

The topics of the seven papers in this review are as follows: (1) progress and problems of freeze drying; (2) expectations for freeze drying, which discusses the advantages of freeze drying and gives the results of taste tests comparing freeze-dried and conventional products; (3) results of taste tests on freeze-dried poultry and costs of freeze-drying poultry; (4) forecast for freeze drying; (5) freeze-dried foods and the frozen-food industry, which discusses the quality of freeze-dried foods, particularly beef, shrimp, crab meat, and peas and gives a table showing the investment, capacity, and costs of a typical freeze-drying plant; (6) implications of freeze drying for foods in the Western United States; and (7) a look into the future of freeze drying of foods. A directory of freeze drying, food processors, and equipment firms in the United States is also included.

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6.134 (*) STUDIES ON *SALMONELLA* IN FISH MEAL

Anonymous
Central Institute of Fisheries Technology (Ernakulam, India)
Indian Fisheries Bulletin 11, No. 4, 21-22 (October 1964)

The object of this work was to find out the maximum temperature that *Salmonella* organisms in fish presscake could tolerate. Sterile samples of presscake were inoculated with known numbers of *Salmonella* organisms and heated for 2½, 4, and 4½ hours at 75°, 60°, 55°, and 50° C. None of the organisms survived being heated at any of these temperatures. Even 1.4×10^5 cells heated for 4½ hr. at 50° were killed.

When the temperatures were lowered to 45° and 40° C., even heatings of 5 and 5½ hr. were not lethal. This finding is of significance, since it indicates the possibility of *Salmonella* contamination in fish presscake that has been prepared by sun drying, where the maximum temperature is about 40°.

[Abstracter: L. Baldwin]

*Item on back of card.

4.14 ANALYSIS OF FATS AND OILS BY GAS-LIQUID CHROMATOGRAPHY. III - FATTY ACID AND FATTY ALCOHOL COMPOSITION OF SPERM WHALE OIL. I.
Mori, Mikio, Yasuko Iwakiri, Akio Ozawa, and Shigeko Shibata (Central Res. Lab., Nippon Suisan Co., Tokyo, Japan)
Chemical Abstracts 67, No. 6, 2310Bp (August 7, 1967)

3.60 THE MOISTURE SORPTION ISOTHERM AS A BASIS FOR THE STUDY OF SORPTION AND STABILITY CHARACTERISTICS IN DEHYDRATED FOODS
Kapsalis, J. G., M. Wolf, Margaret Driver, and A. S. Henick (U.S. Army Labs., Natick, Mass.)
Chemical Abstracts 63, 13927e (November 8, 1965)

6.137 METHOD AND ARRANGEMENT TO REFINE OILS
Neth. Appl. 6,503,471
Chemical Abstracts 64, 5680f (February 14, 1966)

3.60 INFLUENCE OF OXYGEN ON THE PRESERVATION OF DEHYDRATED FOODS

Patron, A., and J. Wuhrmann
Bull. Soc. Scient. Hyg. Aliment. 54, Nos. 7, 8, 9, 192-212 (1966)
Abstracts from Current Scientific and Technical Literature 20, No. 10, Abstract No. 2239, p. 432 (October 1967)

The stability of dehydrated vegetables, fruits, meats, fish, milk, and eggs is discussed; the theories and hypotheses concerned with the manner of oxidation of these products are outlined. The substances involved in the catalytic oxidation of these products are named, as are the natural antioxidants present in dehydrated foods. The other aspects of oxidation discussed are the rate of oxidation of certain dehydrated foods; the factors affecting oxygen fixation, such as gas and water adsorption; vacuum packaging; the use of glucose oxidase and similar catalytic means to prevent oxidation; and the advantages and disadvantages of various packaging materials and methods. [72 references]

3.63 METHOD OF DEHYDRATING FOOD

Canadian Patent 777,749
Food Science Abstracts 2, No. 3, Abstract No. 68/331, p. 112 (March 1968)

An improved process for dehydrating foods (such as fish, fruit, and vegetables) consists of heating them under reduced pressure in the presence of a spray of heated edible oil until moisture no longer escapes through the film of oil formed on the surface of the foods. The oil is removed from the foods while they are still under reduced pressure.

3.238 A SPECIAL SYMPOSIUM ROUNDUP.
PART 2. COMPUTERS IN THE FOOD INDUSTRY

Mills, Franklin, and Jerry Y. Shields (Data Processing Division, International Business Machines, 29 N. Wacker Drive, Chicago, Illinois 60606)
Food Technology 21, No. 9, 38-42 (September 1967)

The authors state that the most significant single development for food processing in the future may be direct computer contact with the process. The advantages of computer contact are maximum product quality, guaranteed uniformity, increased productivity, process standardization, less reliance on operator experience, and cost savings through reduction of waste and scrap. One area that has been investigated is computer control of package weight. Most manufacturers are concerned with the problem of "product give-away" because on high-volume filling lines, thousands of dollars are lost from over-filling. In this paper, the authors report on work undertaken with a major food processor to study a "negative feedback" system for the automatic control of package weight.

[Abstracter: M. F. Tripple]

3.238 PACKAGING UNDER VACUUM AND UNDER INERT GAS

Chomon, M. P.
Packaging 38, No. 443, 46-48, 50 (1967)
Abstracts from Current Scientific and Technical Literature 20, No. 8, Abstract No. 1907 (August 1967)

In this paper presented at the Madrid Packaging Conference are discussed the methods, materials, and machines for the vacuum packaging of meat and fish in France.

6.135 PREPARATION OF FISH ENSILAGE

Anonymous
Central Institute of Fisheries Technology (Ernakulam, India)
Indian Fisheries Bulletin 11, No. 4, 20-21 (October 1964)

One of the objections advanced to the use of fish meal in cattle feed is that it gives the milk a fishy odor. To overcome this defect, scientists have experimented with converting the food into a liquid. This report deals with two methods of liquefaction.

Mineral acids (for example, sulfuric acid and hydrochloric acid) and lactic acid bacteria were used as the liquefying agents. The pH of the mineral acids was adjusted to 2.5 and that of the lactic acid organisms to between 4.1 and 4.4. Molasses was added to material in which lactic acid bacteria were the liquefying agents.

As a means of improving the quality of the ensilage and of enhancing lactic acid production, liquefaction by lactic acid organisms was tried on precooked fish. The percentage of lactic acid produced in the precooked fish was higher (5.2 vs. 3.4) at a lower pH (3.9 vs. 4.1) in the same amount of time (4 weeks). The modification also reportedly resulted in a product free from fishy and rancid odors.

Tables are given that show the changes in pH and lactic acid with time and that break down the nitrogenous components of the boiled, unboiled, and mineral-acid ensiled product. [Abstracter: L. Baldwin]

4.14 LIPIDS FROM SPINAL CORD OF SPERM WHALE.
II - FATTY ACID AND FATTY ALCOHOL COMPOSITION OF WAX AND GLYCERIDE FROM THE SPERM SPINAL CORD

Hatano, Mutsuo, Kōichi Zama, Hiroshi Watanabe, and Hisanao Igarashi
Bulletin of the Faculty of Fisheries Hokkaido University 17, No. 4, 215-228 (March 1967)

An acetone-soluble lipid obtained from the spinal cord of the sperm whale contained glycerides, sterol esters, and a mixture of waxes, which constituted about 72 percent of the lipid. A silica gel-celite column was used to fractionate the lipid into three fractions, Fraction A (wax A), Fraction B (wax B), and Fraction C (glycerides containing free fatty acids and sterols). Fractions A and B were fractionated by distillation and yielded 11 and 6 fractions, respectively. Acid and alcohol fractions were separated from these fractions by saponification and were identified by gas-liquid chromatography. Fraction C was refractionated by chromatographic separation with a silica gel-celite column and then saponified, as were Fractions A and B. The composition of the acids and alcohols of waxes was found to be a straight chain from C_{10} to C_{22}. A similarity was observed between both acids and alcohols. Fractions A and B contained mainly octadecenol and hexadecanol with large amounts of octadecenoic, hexadecenoic, palmitic, arachidic, and myristic acids. Fraction C contained mainly octadecenoic, hexadecenoic, palmitic, eicosenoic, myristic, and docosenoic acids and a large amount of cholesterol.

[Abstracter: M. M. Gwin]

DEHYDRATED FISH

PACKAGING

MANUFACTURE OF FISH MEAL AND OIL

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